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Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms

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USING VIRTUAL WORLDS TO IDENTIFY MULTIDIMENSIONAL STUDENT ENGAGEMENT IN HIGH SCHOOL FOREIGN LANGUAGE LEARNING CLASSROOMS

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ABSTRACT

USING VIRTUAL WORLDS TO IDENTIFY MULTIDIMENSIONAL STUDENT ENGAGEMENT IN HIGH SCHOOL FOREIGN LANGUAGE LEARNING CLASSROOMS

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Dissertation supervised by Misook Heo, Ph.D.

Virtual world environments have evolved from object-oriented, text-based online games to complex three-dimensional immersive social spaces where the lines between reality and computer-generated begin to blur. Educators use virtual worlds to create engaging three-dimensional learning spaces for students, but the impact of virtual worlds in comparison to the traditional face-to-face counterpart has been uncertain in terms of multidimensional student engagement. Research has a need to determine the impact of virtual worlds on student engagement in comparison to the traditional face-to-face environment. The study examined the effects of virtual world and face-to-face learning environments on high school foreign language students' emotional, cognitive, and behavioral engagement, as well as combined engagement. A two-way MANOVA was used to determine the effect of traditional face-to-face and virtual world learning

environments on combined student engagement. A 2 x 2 analysis of covariance was used to determine the effect of traditional face-to-face and virtual world learning environments on emotional student engagement. A 2 x 2 analysis of covariance was also used to determine the effect of traditional face-to-face and virtual world learning environments on cognitive student engagement. A *t*-test was used to determine the effect of traditional face-to-face and virtual world learning environments on behavioral engagement. The study did not find evidence of overall, cognitive, emotional, or behavioral engagement difference between the two learning environments. The findings indicate the virtual world environment is similar to the traditional face-to-face environment in terms of student engagement.

School administrators and teachers can benefit from this research when determining effective means of creating highly engaging learning environments for students. Virtual worlds can be a medium for engaging learning opportunities for students in face-to-face and virtual schools. Additional research in this area is recommended to determine the impact of virtual worlds with different student populations and subject areas.

DEDICATION

This dissertation is dedicated to five people who hold a very special place in my heart.

I am forever grateful for my family's incessant love. Dad, I am proud of your many accomplishments in life and I strive to have a life with as many experiences as your own. You are always there to listen when I am excited to talk about school. You and Mom remained steadfast and positive on this turbulent journey. Mom, you provided the emotional support and resources necessary to see my goal complete. I admire you for being a risk taker and following your passion in life. I am grateful to have found my passion in education so early. Andrew, you did not hesitate to lend a hand when I needed help. You made sacrifices so I could achieve my goal and I am thankful for your warm, giving heart. Jackie, your strength and positive attitude helped me gain my own. Your free spirit keeps a smile on my face through the toughest times.

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CHAPTER I

INTRODUCTION

Overview of Virtual Worlds

Virtual World environments began around the time of the 1980's with multiple player text-based computer games known as Multi User Dungeons (MUDs). These environments were a virtual space of multiple "players" and were usually text-based with little graphical input (Utz, 2000). Players would interact with each other in the world by typing commands that resemble natural speech. MUDs consisted of multiple rooms, and objects in the rooms were described by text only.

The first Multi-user Object Oriented (MOOs) worlds were created in the 1990's. MOOs share with MUDs in that the environment is online, but MOOs are centered on communication of the online members, as opposed to the game itself. Today's MOOs are completely programmable virtual worlds designed for human interaction. The generational names changed over time from MUDs to MOOs to Multi-user Virtual Environments (MUVEs).

The MUVEs are multi user virtual environments where users can interact with digital content, with others, and participate in online events. Both MUVEs and MOOs are advanced forms of MUDs, but all three environments can be identified in a broader sense as virtual worlds, computer-based simulated environments of multiple media where users interact with three dimensional representations of the real people or fictional fabrication of human, animals or inanimate objects, known as avatars.

Virtual worlds differ from virtual reality. Virtual reality is considered a collection of technical hardware with headphones, headsets, and motion-sensing equipment in order

to place the user in a virtual environment. The focus is on the equipment as opposed to the communicative nature of virtual worlds. Virtual reality does not necessarily have an avatar. The person using the equipment may see a computer generation of his/her hands, but not the entire self. In a virtual world, the user can visualize through the environment by manipulating the avatar as one sees on the screen or manipulating in a "first person" point of view like that of virtual reality. The avatar is a computer user's visual representation of himself or herself in the virtual world. The avatar in the virtual world may or may not have human attributes. Computer users can program their avatars to have human characteristics, or take on animal, mythical, or abstract shapes.

A large number of concurrent users, represented by their avatars, can interact synchronously in a virtual environment (Salt, Atkins, & Blackall, 2008). Hundreds or thousands access socially oriented virtual worlds through the Internet. Compared to previous online gaming sites, virtual worlds emphasize social interaction among participants. Among the well known virtual worlds are *Active Worlds*, *OpenSimulator*, *Protosphere*, *Second Life*, and *Whyville*.

Virtual worlds for adults became popular because of multi-user games like *World of Warcraft*. Virtual worlds for children became popular with *Whyville* and *Webkinz*, which also have game-based designs. These virtual worlds not only provide their users with games to play, but also provide the capability to connect and socialize with other users from around the world in real-time. Virtual worlds for children and adults offer a "third place" for social extensions (Lim & Clark, 2010). A total of 570 million accounts for youth in virtual worlds have been created by 2010 (KZero, 2010).

Linden Lab's *Second Life* is currently the best-known and most widely used example of a virtual world (Aldrich, 2009). *Second Life* was developed as an online society entirely built and owned by its users. The users build their own objects, social norms, and economy (Second Life, 2008). Users purchase designated virtual space to build their own simulation, a geographic area in the three-dimensional virtual space (Atkinson, 2008). Objects can be manipulated in this three-dimensional virtual space and users can actively interact with the content and each other (Atkinson, 2008). *Second Life* does not have a common goal for its users. Users are to explore the possibilities of the technology and develop their own environment (Koehne, Redmiles, & Fischer, 2011).

OpenSimulator (OpenSim) was developed as an open source platform for hosting virtual worlds. It is compatible with *Second Life* but can also connect to other virtual world environments while using the same platform. *OpenSim* does not have the corporate limitations like *Second Life* because of the open source environment. Unlike other popular MUVEs such as *World of Warcraft* and *Whyville*, *Second Life* and *OpenSim* are not games; they are virtual environments for users to explore and interact in virtual space. *Second Life* is currently the most prominent of these MUVEs or virtual worlds.

A subset of a virtual world is a virtual learning environment (VLE), which is a designated learning space where educational interactions occur in an electronic environment (Dillenbourg, Schneider, & Synteta, 2002). While virtual learning environments (VLEs) and virtual worlds are similar in that they both are an online means of multiple user communication and collaboration (Dickey, 2005), a VLE differs from a virtual world in two specific ways. First, VLEs are designed with educational pedagogy to provide learning experiences for the users. Second, these environments identify the

importance of the experience for the user in the environment, but organize the space so the educational objectives can be met. *Second Life* and *OpenSim* have been supporting virtual learning opportunities for educators.

Second Life allows for educational institutions to build virtual campuses (Atkinson, 2008). There are more than 100 universities that rent or own virtual land on *Second Life* (Baker, Wentz, & Woods, 2009). The campus space may replicate the physical space or may be entirely different from a traditional physical learning space (Atkinson, 2008). Many educational institutions are utilizing *OpenSim* as well because it can be run on their own server and does not carry the high costs associated with *Second Life*.

Computer Mediated Communication (CMC)

Computer mediated communication (CMC) promotes human interaction through the use of e-mail or other communication programs. The CMC communications assist in cultivating new social relationships and higher cross-cultural interactions. Student anxiety levels are reported lower when the students are using CMC, and when students are less anxious they become active participants in the learning process (Liu, Moore, Graham, & Lee, 2003). Although active participation does not always promote quality learning experience (i.e., an increase in students' usage of challenging words during the discussion), students post more words and sentences online with CMC (Kern, 1995; Liu et al., 2003) and take a more active role in the communications since the teacher's role is decentralized (Chun, 1994). A CMC environment creates an opportunity for students to feel included during the discussion.

One limitation of CMC is that people are unable to see each other in virtual worlds. Natural human gestures are missing in CMC (Utz, 2000). Facial expressions and physical gestures that assist in face-to-face (FtF) communications, the traditional means of communication among individuals who are physically present with one another during conversation (Flaherty, Pearce, & Rubin, 1998), are not present in text-based CMCs. Although users in virtual worlds see the other avatars and are able to text chat through the program interface, social cues in CMCs are limited to what the user types in the chat field area. The lack of cues in CMCs leads to reduced nonverbal communications commonly found in FtF communications. That is, because there is a lack of cues in CMCs, users are unable to identify the non-verbal communication of appropriate or inappropriate values, beliefs, or behaviors.

Since CMC users have to process additional information including setting up the application, manipulating their avatar, and interacting with the environment (Kaminsky, Badger, & Behrend, 2011), it is likely that CMC's will produce greater cognitive loads on the users. According to the cognitive load theory, the working memory is limited in terms of its storage and processing capacity. It is, thus, possible that if learners are asked to cognitively process multiple elements of information simultaneously, they can become overwhelmed (Paas, Renkl, & Sweller, 2004). In a virtual world, users often manipulate their avatar, interact with the environment, and socially interact with other users simultaneously. This can lead to a cognitive overload, especially for new users of virtual worlds. In conditions of overload, learners may cease to learn (Paas et al., 2004).

According to the Social Information Processing (SIP) theory, however, people will eventually adapt their textual and linguistic approaches to meet the relational needs

in CMC (Ramirez, Walther, Burgoon, & Sunnafrank, 2002). This means that users in CMC will add additional text to help guide the reader on the other side to the social cues that may be missing. For example, users may type in smile faces (e.g., ☺) during communications and add social cues in parentheses (e.g., LOL (laugh out loud)) to better communicate social cues that would normally be present in FtF communication. More words may be added in CMC to reduce the communication barrier and to make-up for the filtered out non-verbal cues (Dietrich, 2004). In this perspective, CMC communications can be friendlier than FtF communications. Users are able to express emotions in text and maintain self-preservation (i.e., Hyperpersonal Model), which leads to a friendly atmosphere and social environment (Utz, 2000). The Hyperpersonal Model proposes that users attempt to reduce uncertainty, and in doing so, optimize impressions about themselves through selective or edited self-presentation to others in response to the limited amount of cues in CMC communications (Ramirez et al. 2002). The sender in a CMC environment has greater control over the message than in FtF communications. CMC and virtual world communications may also increase the sense of security for users. In fact, Internet users tend to select computer interaction over FtF when discussing issues that require a solution because there is a separation of the people from the problem and the CMC leads to improved senses of security and satisfaction (Barnes, 2001).

As with the SIP, users in virtual world environments report interacting with others in the virtual world the same as they would interact in the physical environment (Yee, 2006a, 2006b). One study found that brainstorming via networked computers produced more ideas than face-to-face brainstorming and participants also indicated less apprehension during the electronic brainstorming (Kern, 1995). The presence

atmosphere increases opportunities for learners to role play and engage in increased communication. Users are able to hide safely behind a computer screen while developing positive online relationships (Bargh, McKenna, & Fitzsimons, 2002). CMCs provide another opportunity for communication: reduced need for travel as in FtF communications. The interactive nature of CMCs could prove to satisfy the same needs as FtF communications and be a functional alternative (Flaherty et al. 1998).

Student Engagement

Certain conditions need to exist in the classroom for student success; high standards, a meaningful and engaging curriculum, and personalized learning environments are conditions to provide optimal learning opportunities (Klem & Connell, 2004). Students are more engaged with the curriculum and learning environment when they actively participate through interaction and collaboration (Stepp-Greany, 2002). As students progress from elementary to high school, as many as 40% to 60% become disengaged from school (Klem & Connell, 2004). Regardless of socio-economic status, student engagement is a predictor of student achievement in school (Klem & Connell, 2004). The use of technology can create personalized learning environments with more opportunities for student-to-student interaction than in traditional classes (Beauvois, 1998). Using computers as classroom learning tools may lead to increased student engagement on academic tasks (Becker, 2000).

Dimensions of student engagement vary among researchers across time. Credited with one of the earliest theories of engagement, Finn's theory (1989) included a behavioral component and an emotional component. A second model was developed by Connell (1990), which proposed student engagement as a continuum, from positive

emotional tones and behavioral involvement to negative emotions and displaying passive behavior. Recent researchers study aspects of cognitive engagement and reviews of literature (Fredricks, Bluemfield, & Paris, 2004) propose student engagement has multiple dimensions: behavioral, emotional, and cognitive (Appleton, Christenson, Kim, & Reschly, 2006). Behavioral engagement is comprised of student participation in class and school. Participation in academic, social, or extracurricular activities is considered crucial for academic success (Fredricks, 2003). Emotional engagement includes positive and negative reactions to teachers, classmates, academics or school (Fredricks, 2003). Cognitive engagement is indicated on student perspectives, relevance of coursework, and future aspirations (Reschly, Huebner, Appleton, & Antaramian, 2008). To best understand student engagement as a whole, all three areas were explored.

Social Learning in VLEs

The simulated learning environment of VLEs can allow the learners to assume roles in various contexts and have a meaningful, authentic experience (Slator, Juell, McClean, Saini-Eidukat, Schwert, White, & Hill, 1999). VLEs are not restricted to distance education (Dillenbourg et al., 2002) as using VLEs for extensions of face-to-face (FtF) learning experiences can also be beneficial.

VLEs have both text and audio capabilities where users are able to use both features at the same time or selectively. VLEs allow users to type certain cues, such as "/wave" in the text field, which program the avatar to wave onscreen. This capability assists in nonverbal communications through VLEs and a feeling of presence.

Three-dimensional (3D) VLEs have a great potential for social learning (Dalgarno & Lee, 2010). The simulated environment gives a sense of "place" that other online

media cannot yet reproduce. This environment can help foster group collaboration and richer communications, and users can "lose themselves" with new roles and identities. The immersive experience can assist in facilitative learning by enabling multiple perspectives. People tend to become more involved when they are able to direct their attention and energy toward meaningfully-related tasks. Virtual worlds can assist in shortening the distance between the user and the environment (Cram, Hedberg, & Gosper, 2011).

Interactions in a 3D virtual world can help build a sense of community that may not be possible in classes that do not meet face-to-face (Baker et al., 2009). Users are encouraged to engaged in exploration, inquiry, and adopt multiple perspectives (Dalgarno & Lee, 2010). Preliminary research (Feldon & Kafai, 2008) indicates that having avatars in virtual worlds to represent the humans behind the computer indicates a level of presence users experience while in the virtual world. This feeling of presence is positively associated with successful learning outcomes (Feldon & Kafai, 2008). Transactional distance, or the cognitive space between learners, teachers and content, is a function of dialogue and structure in distance learning. Synthesizing presence decreases the transactional distance by increasing the dialogue and creates an environment where users feel more engaged in the learning (Beck, Fishwick, Kamhawi, Coffey, & Henderson, 2011). The use of virtual worlds with text and voice communication gives a natural sense of presence and allow for more complex social interactions (Freitas, Rebolledo-Mendez, Liarokapiz, Magoulas, & Poulovassilis, 2010).

Computer Assisted Language Learning

Technology integration in the language learning classroom started in the 1980's with uses of videotapes, computer language labs, radio and television (Cunningham, 1998). Software started to emerge for computer assisted language learning (CALL), the study of applications of the computer to assist in language teaching and learning (Levy, 1997), but much of it was limited to drill-and practice exercises. CALL began with the Programmed Logic for Automatic Teaching Operations (PLATO Project), which was initiated in 1960 by the University of Illinois (Levy, 1997). PLATO was designed to provide interactive, self-paced instruction for a large number of students using field notes and a restrictive email system. PLATO centered on mechanical elements of language learning, a common limitation in CALL software. The invention of the microcomputer in 1973 saw a boom in CALL activity with introductory books, specialized CALL journals, and teacher-programmers. Because microcomputers were inexpensive, language teachers could begin writing their own CALL programs. The restraint was the teacher's own programming ability (Levy, 1997). There has been much criticism toward the software produced for language learning in the 1980's because of the inferior quality. Much of the criticisms were justified due to a lack of guidelines or standards for the CALL materials. There were no reliable conceptual frameworks of which to measure the work (Levy, 1997).

With the development of the Internet in the 1990's, there was another improvement in CALL with the World Wide Web. One of the first CALL applications developed over the Internet was the International Email Tandem Network (Levy, 1997). The Tandem Network connected universities from around the world to enable students to

learn languages over email. Other projects during the 1990's included Carnegie Mellon's Oral Language Archive and France InterActive's CAMILLE project (Levy, 1997). Since the World Wide Web, there has been a noticeable shift from focus on language teaching to language learning. The technology and capabilities have developed a change in pedagogical beliefs on the use of CALL. The rapid introduction of technology has been sustained and educators have been outpaced by the new introductions.

The use of computer technology for foreign language learning can increase one's self-esteem, preparedness, language proficiency and overall academic success (Dunkel, 1990). Teachers using CALL are able to utilize part of their own products to complement the computer assisted educational materials. Teachers can contextualize language appropriately and they can provide the personal, human touch which is well-received by students (Block, 1991). CALL not only provides teachers with the ability to provide immediate feedback to their students but also the capabilities to simulate real-world situations with integrated audio, video, and graphics (Liu et al., 2003).

It is important to point out that the majority of CALL studies occurred at the college level, with few in the K-12 setting. Besides, the majority of the studies in the college level with CMC and CALL focused on student anxiety levels and attitudes with the technology. Some researchers, thus, recommend that CALL needs to be completed in the K-12 setting and needs to focus on more than anxiety, attitudes, vocabulary acquisition, and language production (Liu et al., 2003). Many skeptics of CALL point out the non-significant differences of CALL to traditional teaching methods. The issue of effectiveness indicates that conclusive findings need to be identified to justify to the

opposition that CALL may have greater learning opportunities over traditional teaching methods (Dunkel, 1987).

Problem Statement

Since the World Wide Web, there has been a noticeable shift from focus on language teaching to language learning. The use of computer technology for language learning can increase one's self-esteem, preparedness, language proficiency and overall academic success (Dunkel, 1990). Users of virtual worlds are able to safely hide behind a computer screen while developing online relationships. Social virtual worlds emphasize social interaction among participants. While students may become more active participants, however, the quality of the learning experience may not prove VLEs beneficial. Currently, however, there is a lack of research with CMCs, CALL, or virtual worlds in the K-12 learning environment. The majority of research presented previously was conducted at the post-secondary level. Educators understand that there are significant differences between K-12 and adult learners. For example, Malcolm Knowles' Adult Learning Theory identifies the difference in synthesizing information between children and adults (Norman, 1999): children tend to have a subject-centered orientation to learning, whereas adults tend to be problem-centered in their learning approach. As individuals mature, the level of dependency moves from total dependency to self-directedness, experiences become resources for learning, and academic pressure decreases as an external factor toward readiness to learn (Norman, 1999). With these factors in mind, the majority of current research applied to CMCs, CALL, and virtual worlds in the post-secondary setting may not provide evidence of possible benefits for K-12 learners.

The lack of research in the K-12 learning environment on student engagement in virtual worlds and language learning warrants research in the field. While there is sizable volume of research available on student engagement in K-12 learning environments, little directly analyzes student engagement in relation to language learning and the use of technology. Existing research with student engagement either analyzes use of technology or language learning, but not both. This study utilized the virtual world as the technological tool in the foreign language learning classroom while analyzing student engagement.

Purpose Statement

In higher education setting, it is reported that the use of computer technology for language learning increases one's self-esteem, preparedness, language proficiency and overall academic success (Dunkel, 1990). The purpose of this study was to evaluate areas of student engagement in the foreign language classroom and determine if a virtual world impacts student engagement, especially in the emotional, cognitive, and behavioral criteria.

Research Questions

The following research questions guided this study regarding virtual worlds and foreign language learning:

1. When practicing conversational foreign language, are there differences in reported student engagement between in the virtual world and in the traditional face-to-face environments?

2. Are there significant group differences of emotional engagement between the virtual world and face-to-face environments while learning a foreign language?
3. Are there significant group differences of cognitive engagement between the virtual world and face-to-face environments while learning a foreign language?
4. Are there significant group differences of behavioral engagement between the virtual world and face-to-face environments while learning a foreign language?

Significance of Study

The rationale for this study is to improve research in the K-12 and virtual world areas. Limited research exists on virtual worlds and K-12 teaching and learning. This study sought to answer questions on virtual worlds with K-12 students in foreign language learning classrooms.

The overall benefit of the research is to the K-12 education programs with online and face-to-face foreign language learning programs. Due to budget restraints and the possibility of creating 24-hour learning environments, school districts are utilizing various online platforms to conduct classes as well as extend learning opportunities. With the information about possible online options for K-12 language learning programs, school districts will not only be able to determine the best educational approaches for language learning and K-12 students, but also identify engagement levels of students in K-12 language learning classes.

This research can assist university programs with online and language learning programs and best meeting the conversational needs of the students. Over 100 universities own or rent virtual land on *Second Life* (Baker et al., 2009) and this research can assist the world language university programs in determining best educational practices with online and VLE platforms. With the evidence found from this study on the impact of student engagement in a virtual world environment as opposed to face-to-face (FtF) communication, university language programs can develop more effective online and FtF language programs in terms of student engagement.

Definition of Terms

In order to provide a better understanding of the content of this document, selected terms are defined below.

Avatar: The virtual representation of one's self online in a virtual world.

Computer Assisted Language Learning (CALL): The use of computer applications to assist in language teaching and learning.

Computer Mediated Communications (CMC): The use of computers to promote human interactions.

Face-to-Face (FtF): The traditional form of human communications in a physical space.

Foreign Language: A language learned in a community where the language is not typically used for ordinary communication.

Internet: A large communication system where individual users can run their own computer network and connect with other local, regional, national, and global networks. This connection of networks is a cooperatively organized system for exchanging information among computers (December, 1996).

Multi-User Object Oriented (MOO) worlds: Online environments designed for human interaction.

Multi-User Dungeons (MUD): Multiple player text-based computer games.

Multi-User Virtual Environments (MUVE): Online virtual world environments where users can interact with digital content and with others.

OpenSim: Open source MUVE platform for virtual worlds.

Second Language: A language that is learned in the specific community of language speakers when the first language is already put in place.

Second Life: Private MUVE platform for virtual worlds owned by Linden Labs.

Virtual Learning Environment (VLE): A designated learning space where educational interactions occur in an electronic environment.

Virtual World: A three–dimensional online space where users can interact with one another.

Limitations and Delimitations of the Study

While the research is designed to answer the research questions in an optimal condition, it should be recognized that there are a few limitations that can affect the study but are not under the control of the researcher. The limitations are as follows.

First, although the instrument used for the study was designed to elicit honest answers, it is impossible to guarantee that the answers given by the students are honest. Second, the study was conducted in a rural school district of 1,911 students in south-western Pennsylvania. Many of the students involved in this study have not had experience in a virtual world environment; therefore the novelty effect can impact the results of the study. The reader is cautioned regarding the generalization of the results to

populations that differ from this one or that vary from the age-group for which the study is designed.

Due to the time constraints and limited resources, this research is delimited in several ways. First, this study is delimited to high school students in grades nine through twelve. This population was chosen because these grades have a foreign language program, whereas the elementary schools do not offer foreign language learning as part of the curriculum.

CHAPTER II

LITERATURE REVIEW

Computer Mediated Communications

Definitions of Computer Mediated Communications (CMC) vary. Early asynchronous Computer Mediated Communications (CMC) typically referred to email exchanges where users would exchange textual information at different times of the communication (Abrams, 2006). Synchronous CMC referred to immediate text messaging on a split-screen where writers and readers could compose messages and see the other half in real time (Abrams, 2006). One way to understand CMC and define it is in relation to the social context with how it is used in work, education, or personal lives (Simon, 2006). In that perspective, CMC can be understood as broadly to the use of technology to provide a means of communication. CMC have developed with the changes in technology, and it currently takes many forms such as using the Internet for text-based communication, cellular phones for text-based messages, Multi-User Dungeons (MUDs) for text-based game communication, or email messages (Spitzberg, 2006).

CMC has three central assumptions for communications. The first assumption is that CMC is a goal-seeking activity aimed at fulfilling a social, instrumental, or emotional goal (Ramirez et al., 2002). CMC can facilitate social interaction with the goal of increasing communication. The second assumption is that CMC is multifaceted and can take several forms (Ramirez et al., 2002). Multiple forms include both synchronous and asynchronous cellular phone communications, email communications, and online chat room communications, just name a few. The final assumption is that CMC liberates

communicators and allows them to seek information in new ways (Ramirez et al., 2002). With the developments in CMC technology, communicators are able to utilize a variety of forms for interpersonal communications.

Interpersonal relationships through CMC are an important mode of communication with modern technology. This type of communication is not immediately adopted by all individuals. In order for CMC to be an effective means for interpersonal communications, individuals must have the time and appeal for CMC (Wrench & Punyanunt-Carter, 2007). This includes having the time to learn the use of the technology and adapt it to one's interpersonal communication needs. People must be motivated to be competent in a CMC environment, possess specialized knowledge in the approach, and learn the conventions and rules that affect CMC interactions (Wrench & Punyanunt-Carter, 2007).

Besides interpersonal communications, CMC has the potential to overcome barriers, enhance dialogue, and create an inclusive environment for communication. The affordances of CMC environments appear to provide enhanced opportunities for dialogue, debate, and the potential sense of community (Tutty & Klein, 2008); an inclusive atmosphere for intercultural relations and an environment where users experience enhanced communication skills (Kim, 2008); and an opportunity to overcome physical barriers and the potential to break down boundaries of nationality, race, language, and ideology (Tanis & Postmes, 2003).

CMC also provides additional opportunities for individuals to express ideas and/or disclose self. CMC stimulates self-disclosure (Valkenburg & Peter, 2009), and people tend to make more intimate self-disclosures in CMC than in face-to-face (FtF)

interactions (Jiang, Bazarova, & Hancock, 2011). This can be due to a greater sense of confidence from the lack of time constraints or non-verbal communication requirements in the CMC environment. In a traditional FtF setting, communicators are addressing time between conversations and nonverbal communications that may express feelings. In CMC, those two factors are removed, and the communicators are able to express ideas without time or non-verbal communication constraints. People, thus, became able to optimize their impression through thoughtful message composition (Jiang, Bazrova, & Hancock, 2011). This can have positive effects between the users in terms of social interaction (Tanis & Postmes, 2003).

As technology evolves, computers have increasingly used audio, video, 3D imagery and animation in communications online (Soukup, 2000); CMC increasingly blurs the notion of text (Spitzberg, 2006); and multi-media interaction is becoming much more affordable and easier to use. This multi-media interaction of CMC, along with its instant feedback capabilities (Wrench & Punyanunt-Carter, 2007), is creating much attention from researchers and theorists (Soukup, 2000). CMC with emerging technologies can enhance, or augment, the visual field of the user with information necessary in the performance of the current task. For example, through a computer or mobile device, the user not only sees the objects that a camera lens is capturing but also computer-generated text over the objects. This results in the computer "disappearing" in the background and combines both real and virtual objects in a real environment (Papagiannakis, Singh, & Magnenat-Thalmann, 2008).

Educational adoption of CMC began in the mid-1970s with the invention of networks, e-mail, and computer conferencing (Harasim, 2000). Academics and educators

had limited access to the computer networks, but scientific researchers became involved in experiments such as the Advanced Research Projects Agency Network (ARPANET), trying to link students with the larger knowledge community (Harasim, 2000). E-mail made more generalized educational adoption possible for information exchange and in the early 1980s, network communications were being adopted by K-12 schools (Harasim, 2000). Two of the first educational CMC examples were the Canadian Réseau d'Ateliers Pédagogique Pilots (RAPPI) network and the InterCultural Learning Network (ICLN), which linked schoolchildren and teachers in joint writing classrooms via e-mail (Harasim, 2000). Since the 1980s, CMC has expanded to include online chats, instant messaging, online learning environments such as Blackboard or Web CT with discussion threads, instant messaging, one-to-one messaging, and many-to-many interactions (Abrams, 2006; Wrench & Punyanunt-Carter, 2007).

Even with all the technological developments, however, the primary aim of CMC in education still remains to provide an environment that supports collaboration between students in order to enhance student learning. CMC affords both instructors and the students the opportunity and time that may not be available in the classroom to work through negotiation of meaning (Meskill & Anthony, 2005). The affordances of CMC use, however, not only include collaborative learning possibilities, but also include meaningful exchanges, extended practice, multiple participant roles, reduced psychological barriers, increased motivation and engagement (Abrams, 2006; Kim, 2008). A record of activity can be kept through the technology, replayed, and modified as needed (Suthers, 2005).

Learning environments with CMC can be used solely without FtF interaction, but it can also be used in conjunction with FtF classroom interaction. With the known benefit of CMC such as 1) improve students' critical thinking skills, problem-solving skills, and communication skills (Kim, 2008), 2) allow for groups thinking and time for reflection not found in a traditional setting, thus eventually causing higher quality interactions (Tutty & Klein, 2008), and 3) generate higher levels of learning and satisfaction in CMC groups compared to strictly FtF groups (Janssen, Erkins, Kanselaar, & Jaspers, 2006), FtF instruction can be complemented by the use CMC in conjunction with FtF interaction. CMC can provide another venue for practice to the FtF instruction (Meskill & Anthony, 2005).

With the benefits of CMC in education, there are also limitations, as students may be less likely to be voluntarily engaged in the CMC environment (Kim, 2008). CMC is still mostly text-based communications, relying on text to express non-verbal cues that are present in a traditional FtF interaction. CMC communications lack many non-verbal cues that are present in FtF interactions and this can affect group decision making and individual behaviors (Noy, Ruban, & Ravid, 2006). Some research argues that social functions normally communicated in nonverbal FtF communications do not occur in FtF (Walther & D'Addario, 2001). Facial expressions and body language are examples of nonverbal cues that influence FtF conversations, but are not present in CMC. Communicators in CMC thus need to rely on text-based nonverbal cues to supplement the conversation.

Educational adoption of CMC develops in conjunction with the theoretical change of viewing learning. Originally, CMC was adopted with the behavioral learning theory,

and computers were programmed to elicit external learner responses. With the advances in technology and its capabilities, new CMC features are promoting student engagements, motivation, and retention (Abrams, 2006). New CMC features include instant chat, social media, and multimedia sharing. With the constructivist learning theory at the forefront of current educational practices, CMC has developed as more of a social learning environment.

Theories Supporting Computer Mediated Communications

Scientific theories serve a variety of functions and goals. In order to gain a better understanding or provide an accurate prediction, one common justification is to develop a theory (Sweller & Chandler, 1991). There are theoretical questions in regard to the acquisition and interpretation of information in CMC. Technological advances have provided new tools to allow people to seek and acquire information, but conceptual models remain on investigating the use of CMC for social information seeking (Ramirez et al., 2002). Cognitive load theory, social presence theory, social information processing theory, hyperpersonal, social identity theory, and social learning theory are commonly referenced in the CMC literature. Each theory is discussed below with its relationship to CMC.

Cognitive Load Theory

Cognitive load theory is a psychological theory explaining psychological or behavioral human actions. The idea of cognitive load was not new at the time of the theory development. The idea of "mental load" was already defined in human psychology, differentiating between task demands and the person's ability to master the demands (Moreno & Park, 2010). Mental load has been investigated in a variety of fields

and other psychological factors began to surface, such as willingness, meaningful tasks, and individual differences (Moreno & Park, 2010). Cognitive load is similar to work load because it takes into consideration the demands of tasks put on individuals (Moreno & Park, 2010).

Cognitive load theory (CLT) started in the 1908s and expanded into the 1990s (Paas, Renkl, & Sweller, 2003). There are central assumptions to the cognitive load theory in relation to working memory and long-term memory. Cognitive load theory assumes that working memory has a limited capacity when dealing with novel information (Merriënboer & Ayers, 2005). A working memory stores about seven elements and can operate on two to four elements at one time (Merriënboer & Ayers, 2005). The working memory is able to deal with information for no more than a few seconds, with almost all information lost after about twenty seconds unless it is refreshed by rehearsal (Merriënboer & Ayers, 2005).

Working memory consists of two channels: the auditory/verbal channel for processing auditory and verbal input representations and the visual/pictorial channel which processes visual inputs and pictorial representations (Mayer & Moreno, 2003). Each channel has limited capacity for cognitive processing. In learning situations of high cognitive load, students will benefit from levels to make the process manageable (Paas et al., 2004).

Well-organized knowledge structures allow people to reduce their working memory load by combining many elements of information into larger chunks that can be treated as single elements in working memory (Kalyuga, 2007). Novel information must be processed in working memory in order to construct schemas in long-term memory

(Merriënboer & Ayers, 2005). Schemas are the cognitive organizational structure and conceptual framework a person utilizes for learning (Merriënboer & Ayers, 2005). The schemas are used to organize and store knowledge, and reduce the working memory load (Merriënboer & Ayers, 2005). In contrast to working memory, long-term memory has almost unlimited capacity (Merriënboer & Ayers, 2005). Long-term memory is traditionally associated with the storage of an organized knowledge base in the form of a hierarchical knowledge structure (Kalyuga, 2007).

There are two categories with cognitive load: intrinsic and extrinsic cognitive loads. Intrinsic cognitive load is the memory required by the thinking task at a given time (Amarasing, n.d.). Intrinsic cognitive load cannot be changed and depends on the complexity or difficulty level of the information presented at one time. Information can be presented in text, visuals, multimedia, aural, or tactile modes (Amarasing, n.d.; Paas et al., 2004). Extraneous cognitive load, on the other hand, is generated by the manner in which information is presented to learners and is under the control of the designers of the instruction (Chandler & Sweller, 1991). Extraneous cognitive load can be attributed to the design of the instructional materials and can be changed by enhancing organization through chunking and presentation techniques (Amarasing, n.d.; Chandler & Sweller, 1991). When the processing load becomes unnecessary and interferes with the acquisition of information, it is considered extraneous cognitive load (Paas et al., 2003). When intrinsic cognitive load is high and the extraneous cognitive load is high, then the total cognitive load will exceed the mental resources and learning may fail to occur (Amarasing, n.d.). By reducing the extraneous cognitive load, one will allow for more

working memory capacity, thus better enabling the mind for learning to take place (Bannert, 2002).

Most of the findings in cognitive load theory have direct instructional application (Sweller & Chandler, 1991). High levels of cognitive tasks can cause learners to become overwhelmed. When students are dealing with familiar material, the limited working memory becomes essentially unlimited and there is a degree of automation to the memory (Paas et al., 2004). When novice learners face with novel and high levels of cognitive tasks, however, meaningful learning is limited because learners need to spend mental processes decoding complex information elements (Paas et al., 2004). The instructional design enables working memory to be capable of processing instruction (Kirschner, 2002). The challenge for educators is that working memory is limited to no more than two or three interactive elements simultaneously because working memory is also used for organizing, comparing, and contrasting (Kirschner, 2002).

The manner in which information is presented and the activities required of learners can cause a cognitive load. In order for learning to occur, the total load cannot exceed the working memory capacity (Paas et al., 2003). Solutions for reducing cognitive load include segmenting, pre-training, signaling, and eliminating redundancy (Mayer & Moreno, 2003). Explanations and examples of each strategy are provided in the following paragraphs.

Segmenting, or chunking, is presenting material in workable segments and allowing the learner the time to process information. Working memory can be easily overloaded if more than a few chunks of new information are processed simultaneously

(Kalyuga, 2007). Segmenting materials provides learners the time to organize their thoughts and process the new information.

Pre-training prepares the learner for the content that will be presented by combining a learner's prior knowledge and assisting them with making connections with new knowledge. If learners do not have sufficient prior knowledge that overlaps with the external guidance, they cannot coordinate different representations and will exceed their working memory capacity (Kalyuga, 2007). A learner's prior knowledge determines what level of cognitive load the individual will experience (Brünken, Plass, & Leutner, 2003). If information cannot be borrowed from other sources, learners use default problem-solving mechanisms from the working memory which imposes a cognitive load and leaves little cognitive resources for meaningful construction of new knowledge (Kalyuga, 2007).

Signaling is a strategy that uses signals, such as sounds or visual cues to identify key elements in new learning. This puts particular attention on certain parts of the content and assists the learner in differentiating between important and less-important elements. Signaling provides cues to the learner on how to select and organize material (Mayer & Moreno, 2003). Learners receive signals through outlines, stressed words, or highlighted text.

By eliminating redundancy, the learner can spend more cognitive energy on the current material and less energy with redundant material. An overload of material can end up presenting information in a confusing way. Students understand material better when they are presented with non-redundant material. Eliminating redundancy provides

content in a manner that is best for students to cognitively process the information (Kalyuga, 2007; Mayer & Moreno, 2003).

All of these strategies can assist in reducing the cognitive load on the individual. Effective instructional materials can facilitate learning by directing cognitive resources toward activities (Chandler & Sweller, 1991). Cognitive load theory in CMC identifies that learners need to be presented with planned segments of material in order to reduce extraneous cognitive load on the learner. When presenting content, both visually and orally with CMC, the limitations of the working memory must be taken into consideration.

Social Presence Theory

Social presence is the degree of feeling or perception of being connected with another intellectual entity (Tung & Deng, 2007). In the physical environment, a sense of social presence can be felt due to FtF interaction and expressing nonverbal cues. In a CMC environment, the sense of social presence can be more challenging to identify. In the CMC environment, social presence involves the ability of people to be perceived as real, 3-dimentional beings despite communicating in a computer-mediated environment (Stein & Wanstreet, 2003). Social presence is a factor of both the communicators' perceptions of presence in the interactions and the CMC medium because different media formats provide people with different levels of interactions (Richardson & Swan, 2003).

The social presence theory classifies different communication media on a continuum where the degree of social presence is equated to the degree of awareness of the other person in the interaction (Kock, 2004). The communication media differ in their degree of effect on social presence and these degrees play an important role in how

people interact. More opportunities for expressing communications can increase the sense of social presence. People who use nonverbal cues, such as pictures or other media, can help improve people's feelings of social presence in the CMC environment (Sallnäs, 2005).

Social presence theory in the learning environment requires learners to project themselves as real people in a learning community (Na Ubon & Kimble, 2003). The design of effective learning environments needs to incorporate elements of social presence theory to increase the quality of learning. Social interaction in a CMC learning environment requires to be organized by the teacher; otherwise it is unlikely to occur (Kreijns, Kirschner, & Jochems, 2003). One misconception in CMC is that social interaction will inherently occur in CMC without teacher intervention. Formal learning environments require teacher intervention to ensure that social interaction occurs in CMC. It involves intentionally designing the instruction (Kreijns et al., 2003). Online education and CMC can support the social practice of learning because the medium allows learners to present themselves as "real" and be able to connect with others while communicating in online learning environments (Lowenthal, 2010).

The social presence theory in learning identifies an increase in the sense of belonging and social cohesion to the learning community (Na Ubon & Kimble, 2003). The strong sense of community increases persistence of students in online programs and also enhances the information flow, learning support, group commitment, collaboration and learning satisfaction (Na Ubon & Kimble, 2003). The sense of presence enables students to interact comfortably with peers and instructors. By increasing social presence, the educator can better encourage learning satisfaction, initiate discussions of

more depth and promote collaborative learning (Na Ubon & Kimble, 2003). According to social presence theory in education, the greater the social presence, the better the ability to substitute telecommunications media for FtF encounters and still achieve the desired collaborative outcome (Stein & Wanstreet, 2003). Teachers that develop environments with the social presence theory in mind allow opportunities for learners to better communicate with one another and have a higher quality learning experience.

Social Information Processing Theory

Social information processing theory states that people are able to form impressions of others strictly from online material, but it takes longer than if they were face-to-face (Westerman, 2008). Communicators strive to develop positive and meaningful relationships, but CMC communications do not transmit social cues at the same rate as face-to-face communications (Tanis & Postmes, 2003). This indicates that CMC users will need to invest more time and energy in developing a positive relationship (Tanis & Postmes, 2003). Users, however, will adapt to the CMC medium and find ways to overcome the lack of nonverbal social cues through textual communications (Walther & D'Addario, 2001). People learn to verbalize online over time and the paralanguage can become an important factor in the development of impressions (Utz, 2000). One example of adapting and developing accommodations is with the use of emoticons (Walther & D'Addario, 2001). Emoticons are "smile faces" or "relational icons" created with typographic symbols in a sideways manner resembling facial expressions :-), ;-), and :-((Walther & D'Addario, 2001). E-mail use eliminates the possibility of visual cues such as head nods or facial expressions, so CMC users will incorporate emoticons to accommodate visual cues and add meaning to the textual message (Walther &

D'Addario, 2001). The use of visual cues with text has shown to produce a more positive attitude than providing text alone (Walther & D'Addario, 2001).

The social information processing (SIP) theory assumes that 1) communicators using CMC will actively develop social relationships over time (Walther & D'Addario, 2001), 2) the communicators will require additional time compared to FtF interactions in developing social relationships over CMC due to the lack of nonverbal cues (Walther & D'Addario, 2001), and 3) to respond appropriately to social situations, information has to be processed in an orderly fashion in a CMC environment (Orobio de Castro, 2004). Users who are unfamiliar with one another form opinions based on textual interactions. These textual interactions need to be presented in an organized form for the participants to understand one another (Walther & D'Addario, 2001). Users do achieve typical relationships online, but it requires a sufficient amount of message exchanges compared to the traditional FtF communication. The lack of nonverbal cues limits the scope of exchanges, which means it requires more messages and more time to bring relationships in CMC to the same level as FtF (Walther & D'Addario, 2001).

Because the process takes longer, there are ordered steps for communication in CMC. First, the user calls attention to the communication. Calling attention to the communication can be conducted, for example, through an email or a text message. Second, the user delivers information through the textual communications. Third, the user responds to the situation and reevaluates the response. Finally, the user develops anticipated outcomes of the communication. These four steps enable a similar communication to FtF while using a CMC environment and can be presented in a sequential manner (Lemerise & Arsenio, 2000). CMC message exchanges can span over

long periods of time, depending on the medium use and the connection of the individuals. A conversation over email may extend over days, weeks, or months between users to communicate ideas. A similar conversation in the traditional FtF setting may occur rapidly, but would require both individuals to be engaged at the same time in a conversation with one another. Social information-processing theory identifies that CMC reduces the speed rate of social interaction, but it does not eliminate the amount of such information (Hancock & Dunham, 2001).

Hyperpersonal Model

People are concerned with the ways others perceive them. This can motivate people to manage their behavior in order to present favorable appearances. People want to display favorable behavior in a CMC environment as well. According to the hyperpersonal model, users can take advantage of the CMC's diminished nonverbal cues to enhance their perceptions (High & Caplan, 2009).

Physical features, appearance and voice are unavailable in text-based CMC (Walther, 2007). Social cues, such as facial expressions and voice tone, found in FtF conversation are not present in the CMC environment. Originally, CMC in this sense was considered impersonal because of the lack of nonverbal social cues. The lack of nonverbal social cues in the CMC environment can cause users to create exaggerated viewpoints from the information they create, or produce more intense interpersonal impressions in CMC (Hancock & Dunham, 2001). The writer is able to compose messages in physical isolation from the receiver and mask involuntary nonverbal cues (Walther, 2007). Receivers have limited access to contradictory cues, which leads them to form stereotypical impressions of their partners that are more intense and extreme than

in FtF (Jiang, Bazarova, & Hancock, 2011). Empirical tests have demonstrated that CMC leads to more extreme impressions than FtF and more positive relations than FtF over time (Walther, 2007). Impressions formed in the CMC environment are less detailed but more intense than those formed in a FtF environment (Hancock & Dunham, 2001). There is evidence that CMC can be just as good as or better than FtF settings in respect to impression formation (Kreijns & Kirschner, 2001).

The hyperpersonal model recognizes the cognitive processes and the unique communicative features of the CMC environment (Hancock & Dunham, 2001). Cognitive resources that would normally be utilized in a traditional FtF interaction can be redirected toward text-based communication in a CMC environment. The amount of time one can spend in creating a CMC message prior to delivery, with less social awkwardness, differs from FtF conversation (Walther, 2007). CMC users have more time and reallocation of cognitive resources to develop text-based communication that has the capacity of a more positive impression. CMC users are also able to review and change the content of their communication prior to sending them to the other individual. The ability to edit one's self-presentation after the fact is a unique attribute of asynchronous text-based communication (Gonzales & Hancock, 2011).

Social Identity Theory

One of the problems with prior research investigating social cues is that it tends to compare CMC with FtF interactions (Tanis & Postmes, 2003). The principals of the social identity theory argue that in CMC there is visual anonymity, which obscures the recognition of interpersonal differences among group members (Wickham & Walther, 2007). Ambiguity is assumed to have both social and behavioral consequences (Tanis &

Postmes, 2003). Recent studies provide evidence that anonymity increases identification with group (Michinov, Michinov, & Toczek-Cappelle, 2004).

Social identity theory argues that people have multiple selves (Postmes, Spears, & Lea, 2000). The self is not one person, but comprises of multiple social identities associated with the values of different group memberships (Postmes et al., 2000). The social categories in which one belongs are an important part of one's self-concept. The self concept can change from context to context when the need for different social identities arises (Postmes et al., 2000).

The interactive model of social identity formation incorporates suggestions that small groups create a social identity from a shared social category, and social identity can be from intergroup communication (Postmes, Haslam, & Swaab, 2005). Group membership brings the expectation of a common understanding and provides the framework to define the group in relation to other groups (Postmes et al., 2005). Group processes tend to be analyzed as a function of the characteristics of, and relationships between, individual team members (Postmes et al., 2005). When individuals in a group do not know each other, less attention is focused on the differences, and more attention is paid to the similarities between one another (Michinov et al., 2004).

CMC can obscure interpersonal differences that interfere with group identification and can heighten group salience and enhance adherence to group norms (Lee, 2007). CMC can be depersonalizing and identity can make group-level social identities more important, so the real effect of CMC is to increase conformity to the local group norms (Bargh & McKenna, 2004). Users adapt to the norms established in the CMC

communication to fit their needs (Soukup, 2000). CMC can cause changes in communication and can influence social relations (Tanis & Postmes, 2003).

With learning environments with CMC, attention needs to be paid to the development of group identification if the learning process is going to be successful (Michinov et al., 2004). People need to feel a sense of belonging during the learning process. Online learning environments and chat rooms can be utilized to build a social identity (Michinov et al., 2004). In social identity theory, by developing intergroup communication, one is able to better create virtual learning communities. Social identities are important and by using CMC, one can increase conformity in a group. By reducing ambiguity, one can increase intimacy across group members and liberate individuals in a VLE.

Social Learning Theory

The social learning theory states that understanding comes through modeling, participation, and reaction to the behaviors and thoughts of others (Pawan, 2003). It interprets human behavior as the product of a person's interaction with the cognitive, behavioral, and environmental influences that surround them (Beldarrain, 2006). The central concept, participation in a community life, is the basis for learning in social learning theory. People gain from taking part in the communication since humans are intrinsically social. Participation in a community leads to learning since it contributes to the construction of identity.

CMC can create a productive learning environment with social interaction (Kreijns & Kirschner, 2001). Social interaction is sometimes taken for granted in CMC and some believe that it will automatically happen because the technology makes it

possible (Kreijns & Kirschner, 2001). Negotiation of meaning corresponds to the process at the base of any individual and collective learning (Henri & Pudelko, 2003). Social learning theory encompasses attention, memory, and motivation, so it spans both cognitive and behavioral frameworks (Lewis & Chen, 2010).

Evolutional Virtual Worlds

Definition

The definition of what constitutes a virtual world is controversial among researchers, but the general consensus is that a virtual world environment is a digital environment that has a 3D graphical interface, supports massively multi-user remote interactivity, is persistent, is immersive, and emphasizes user-generated activities and goals (Book, 2004; Gilbert, 2011). The computer-generated display allows the user to have a sense of being immersed in an environment other than the one they are actually in and users can interact with that secondary environment (Schroeder, 1996). The three important features that create an immersive environment are the illusion of 3D space, avatars that serve as the visual representations of the user, and an interactive chat element for communication (Dickey, 2003). The virtual world combines aspects of previous technologies into one experience (Damer, 2008).

3D virtual worlds can be simply described as networked, desktop virtual reality (Dickey, 2003). Virtual worlds are part of a larger group of Internet-based applications, known as social media (Kaplan & Haenlein, 2009). This term applies Internet-based applications to help users share opinions, insights, experiences and perspectives (Kaplan & Haenlein, 2009). Social media forms include content communities, social networking sites, and collaborative projects (Kaplan & Haenlein, 2009). Social networking sites

allow users to create a profile and connect with other users around the world. They are a virtual social community of members who communicate online around a common interest. Social networking applications started in 1997 with SixDegrees.com (Messinger et al., 2009). SixDegrees.com was a social networking website that connected users based on the idea of six degrees of freedom. At the end of 2003, social networking websites like *Friendster*, *MySpace*, *Facebook* and *LinkedIn* created a new awareness to social media. Social networking sites are different from other web applications because making and accumulating friendship connections is the sole focus of the activity (Beer, 2008). The social factor often explains the popularity of virtual worlds. Most of the activities offered in virtual worlds are already present in singular player games, but the collaborative nature and shared experience is what makes social virtual worlds different (Ducheneaut, Yee, Nickell, & Moore, 2006).

Game-oriented virtual worlds have a storyline behind the game play that guides the activities and goals of the users who interact in the virtual world (Franceschi, Lee, Zanakis, & Hinds, 2009). The game designers create the images, sounds, and activities of the virtual environment to support the story line and the theme (Franceschi et al., 2009). Users are provided choices while interacting in the game to have a unique experience, but the choices are limited because there already is an established story line (Franceschi et al., 2009). Game-oriented virtual worlds have a "closed-culture" because users are limited to the storyline that was created (Franceschi et al., 2009).

"Open-culture" virtual worlds are social virtual worlds where users are provided tools to create their own cultural artifacts in the virtual world. There is an emphasis on creativity and self-expression because users have few limitations with creating objects

(Franceschi et al., 2009). These kinds of virtual worlds are common to educational pursuits and the open culture is created and maintained by the users (Franceschi et al., 2009).

Virtual worlds have three characteristics that separate them from other social media applications (Kaplan & Haenlein, 2009). First, virtual worlds allow users to interact with others in real time. Content on social media pages like *Facebook* and *Wikipedia* is usually posted and then consumed by others with a time delay, whereas virtual world conversations are identical to real time conversations. Second, virtual worlds allow their users to create fully customizable avatars (Kaplan & Haenlein, 2009). Avatar customization is far more flexible in a virtual world, as compared to an image posting on a *Facebook* or *YouTube* page (Kaplan & Haenlein, 2009). Third, content communities like blogs and wikis are two-dimensional with a focus on content sharing, but virtual worlds have the possibility to explore environments in a 3D environment (Kaplan & Haenlein, 2009).

History

Virtual worlds began in the 1970s as Multi-user dungeons (MUDs) (Damer, 2008). The first MUD was a text-based adventure game in a persistent world that allowed multiple users to log on at the same time. The communications and interaction in MUDs is synchronous, where people have to solve quests to gain experience points and increase their skill and level. As graphical and processing capabilities improved, it became popular in the 1990s for MUDs to have graphical front-ends (Yee, 2006a). The offspring in the 1980s and 1990s were virtual worlds of a variety of genres, such as first person shooter, fantasy role-playing, simulators, shared board games, and social virtual

worlds (Damer, 2008). The game is typically text driven with players reading descriptors of rooms, objects, events, and characters in a virtual world (Chen & Park, 2005). Participants in MUDs take part in role-playing, with aims of killing monsters and advancing the level of their character (Utz, 2000). About two-thirds of the MUDs in existence are specialized for playing a game like *Dungeons and Dragons* (Chen & Park, 2005). MUDs became third social places which draw people with common interests from all around the world (Soukup, 2006). Communication and interaction in MUDs is synchronous. People are asked to solve quests to gain experience points and increase their skill and level.

Virtual worlds have limited visual and social cues, but the immersion of the text-based virtual environment was able to support virtual communities that had characteristics of traditional communities (Dieterle & Clarke, 2007). MUD players report using more emoticons over time as they learn to accommodate the information in an environment where nonverbal cues are unavailable (Walther & D'Addario, 2001). The use of the emoticons was a significant predictor of relationship development in one study, which accounted for 14% of the variance in relationship building in MUDs (Walther & D'Addario, 2001).

As the computer capabilities advanced in power and network connectivity, MUDs resulted in multi object-oriented (MOOs), multi-user virtual environments (MUVEs), and massively multiplayer online role-playing games (MMORPGs) (Dieterle & Clarke, 2007). *Ultima Online* launched in 1997 and is recognized to be the first MMORPG, a persistent, graphical, online environment that allowed thousands of users to be logged on at the same time (Yee, 2006a). Social interaction in an MUVE exists without the need

for a specific goal or purpose. The social aspects of virtual worlds exist in an open-ended system which provides freedoms to the individual (Warburton, 2009).

Virtual worlds and the massively muli-player online games (MMORPGs) like *World of Warcraft* were a financial driver to develop 3D virtual worlds (Damer, 2008). MMORPGs have users striving to attain certain levels and travel through increasingly challenging tasks (Messinger et al., 2009). Millions of users spend an average of 22 hours per week interacting with each other in MMORPGs through the use of avatars (Yee, Bailenson, Urbanek, Chang, & Merget, 2007).

Social virtual worlds are the main area of focus for this research. The primary purpose of a social virtual world is to create virtual objects and communicate with others (Damer, 2008). In social virtual worlds, there are no rules, except the ones the users create being in world. Being "in world" is the sense of presence in a virtual world. Users will comment on being "in world" to reference they are online and their avatar is present in the virtual world. The term "avatar" was first used in the social virtual world, *Habitat* in 1980s to describe individual users (Damer, 2008). In Sanskrit, "avatara" means "incarnation" and this term was made popular by Neal Stephenson's novel *Snow Crash* (Messinger et al., 2009). The avatar is a graphical representation of the user in a virtual world. The companies and early adopters of social virtual worlds abandoned development at the end of the 1990s before the "dotcom" crash of 2000 (Damer, 2008). The only original social virtual world, *Alphaworld* (now *Activ Worlds*), remained intact after 2000 (Damer, 2008).

Second Life and *Alphaworld* quickly developed into a large community of object makers, builders, and marketers (Damer, 2008). Several million people have used

Second Life worldwide and typically 50,000 to 65,000 people are logged on at any time (Baker et al., 2009). *Second Life* is a place for social interaction and avatars travel to places in the virtual world, join social groups and events (Baker et al., 2009). The continued drop in computer prices and the increase in capacity and broadband networking access have added to the virtual world increase in population (Messinger et al., 2009). Virtual worlds have evolved into sophisticated 3D interactive systems with social and economic interactions as the main drivers (Hendaoui, Limayem, & Thompson, 2008).

Current Trends and Future Prospects of Virtual Worlds

Virtual worlds exhibit five characteristics in common (Jensen, 1999). First, every position in the space is identified by a set of three coordinates (Jensen, 1999); X- Y- and Z- coordinates which assist the user in navigation, use, and construction in a 3D virtual space. Second, the space is geometrically finite (Jensen, 1999). The worlds may have realistic representations of buildings, vegetation, animated objects, or animals with earth-like terrain and vegetation (Robbins & Butler, 2009). The environment can appear "real" with virtual water and landscaping (Aldrich, 2009). The level of realism is one of the most important dimensions that differentiate the virtual worlds from traditional social media (Kohler, Matzler, & Füller, 2009). Third, the space is seamless and the user can navigate continually (Jensen, 1999). The environment exists day and night and persists even when a designated user is not using it (Robbins & Butler, 2009). Users can navigate from one area to another without boundaries and on the same computer. Fourth, there are a set of rules both physically, biologically and socially that are set by the creator (Jensen, 1999). Users may be able to fly through the virtual space or adopt a set of social norms specifically for that space. Users from different locations can meet and interact at the

same time (Aldrich, 2009). Body language cues can be programmed by the user to convey social cues (Aldrich, 2009). Users "see" the 3D virtual world with a first-person perspective, where the images on the computer screen represent what the avatar would be seeing in the virtual space (Robbins & Butler, 2009). Users can exercise new behaviors, repeat the behavior to gain a new experience and observe the outcome of that behavior and adjust accordingly (Wagner, 2009). Fifth, each space indicates a vision for a virtual world and the capabilities of a virtual world space (Jensen, 1999). Users develop the space according to their own vision on how a virtual space should be utilized.

Linden Lab's *Second Life* is currently the best-known and most widely used example of a social virtual world MUVE (Aldrich, 2009). *Second Life* was founded and is managed by Linden Research, Inc. of San Francisco (Kaplan & Haenlein, 2009). *Second Life* was developed as an online society entirely built and owned by its residents. The main difference between *Second Life* and other virtual worlds is that the residents of *Second Life* hold the copyright on all content they create and are permitted to sell their content to other *Second Life* users in exchange for Linden Dollars (L$) (Kaplan & Haenlein, 2009). Avatars in *Second Life* are able to exchange real-life currencies for Linden Dollars through a *Second Life* exchange at a floating exchange rate (Kaplan & Haenlein, 2009). In April 2008, a total of U.S. $8.7 million was exchanged into L$2.3 billion and has motivated many companies to become involved in Second Life (Kaplan & Haenlein, 2009). There are an estimated 16 million user accounts in *Second Life* (Farley, 2011). The residents build their own objects, social norms, and economy (Second Life, 2008). Users purchase designated virtual space to build their simulation, a geographic area in the 3D virtual space (Atkinson, 2008). Compared to other virtual

worlds, users face no restrictions regarding their avatar and the self-presentation that can be created (Kaplan & Haenlein, 2009). Avatars can appear in any possible form and surround themselves with any types of objects (Kaplan & Haenlein, 2009). Communication between avatars is most often conducted in written format, either through chat or instant messages (Kaplan & Haenlein, 2009). A voice-chat option was developed in 2007 and allows avatars to speak to large groups or to individuals (Kaplan & Haenlein, 2009).

Second Life allows for educational institutions to build virtual campuses as well (Atkinson, 2008). There are more than 100 universities that rent or own virtual land on *Second Life* (Baker et al., 2009). The campus space may replicate the physical space or may be entirely different from a traditional physical learning space (Atkinson, 2008).

Open virtual worlds consist of MUVEs with unstructured objectives, user-generated content, immersive 3D virtual environments, and social networking elements used between people through their avatars (Messinger, Stroulia, & Lyons, 2008). *OpenSimulator* (OpenSim) was developed as an open source platform for hosting virtual worlds. It is compatible with *Second Life* but can also connect to other virtual world environments while using the same platform. *OpenSim* does not have the corporate limitations like *Second Life* because of the open source environment. Many educational institutions are utilizing *OpenSim* because it can be run on their own server and does not carry the high costs associated with *Second Life*.

Most social virtual worlds are used by adults. *Second Life*, for example, only permits users to register if they are over 18 years of age. Although *Second Life* is the most popular social virtual world, this has not limited the development of virtual worlds

designed specifically for children. Virtual worlds for children have been available for many years, but only recently have they become attractive to children (Marsh, 2010). As of 2010, there are over 150 virtual worlds operating or in development aimed at children under the age of 18 (Marsh, 2010). Children can play games, interact with other avatars, dress up their avatars, buy virtual goods, care for virtual pets, answer trivia, and participate in educational games and activities (Subrahmanyam, 2009). Virtual worlds that are particularly popular with children eight years and younger include *Webkintz*, *Neopets*, *Club Penguin* and *Barbie Girls* (Marsh, 2010). Some sites, such as *Club Penguin* and *Barbie Girls* focus on including parents in the sites, which has been a strategy to make parents feel more comfortable with the safety measures put in place (Marsh, 2010). Many of the activities in the virtual worlds are consumer-oriented, where children spend a great deal of their time shopping or working in order to afford more virtual possessions (Meyers, 2009). Information technology used by children in their formative years can influence their learning strengths and preferences. Immersive interfaces can aid in designing educational experiences that build on students' digital fluency to promote engagement (Dede, 2009). Logging in, creating an online identity, chatting, and sharing a profile with others are skills and "literacies" that transfer across several applications for children (Meyers, 2009).

Virtual worlds could develop toward standardization and interoperability as one large metaverse (Kaplan & Haenlein, 2009). The phrase "metaverse" was coined by Neal Stephenson from his 1992 science fiction novel Snow Crash to describe a persistent, immersive 3D virtual environment in which business and entertainment could be engaged by any user, anywhere, with any terminal (Collins, 2008). Currently virtual worlds are

single program downloads where users must login to each program to be part of the different environments. In the future, with a transition to open source material, a connection of virtual worlds could transform them to one large metaverse (Kaplan & Haenlein, 2009). In 2007, Linden Lab made its source code for *Second Life* viewer available to everyone, which allows each Internet user to modify and improve the gateway (Kaplan & Haenlein, 2009). One year later, Linden Lab and IBM demonstrated avatar transferability between the *Second Life* grid to an *OpenSim* grid (Kaplan & Haenlein, 2009). New initiatives are being developed in the areas of portable identities. This would allow virtual world avatars to roam between virtual world platforms while maintaining their own identities (Warburton, 2009). Technologies are being developed that allow users to travel directly between virtual world grids (Eno, Gauch, & Thompson, 2009). Currently virtual world navigation is difficult to learn and avatar customization can take a long time to master (Kaplan & Haenlein, 2009). With advancements in technology, the software usability of virtual worlds could improve to make it easier for users to navigate and explore virtual world environments (Kaplan & Haenlein, 2009).

Virtual worlds are being developed for mobile devices. With mobile phones having more advanced computing technology, mobile gaming or social virtual worlds will no longer be limited to desktop computers (Freitas & Griffiths, 2008). One group is proposing bridging the divide between virtual and real worlds by having real world activities represented in real time in the virtual world. Personal avatars will move inside artificial spaces following the real positions of people by using sensors embedded in mobile phones (Musolesi et al., 2008). High-end graphics and live video feeds can soon

be available on the mobile devices for gaming or to support learning environments (Freitas & Griffiths, 2008).

Educational Adoption

Virtual worlds are becoming a powerful media form, and new educational environments are being designed (Freitas & Griffiths, 2008). The crossover between Web 2.0 technologies and virtual worlds is becoming clearer with live chats and content generators being integrated into virtual worlds (Freitas & Griffiths, 2008). Web 2.0 technologies are web applications of interactive content that is user-created. First generation web tools included email, chat rooms and discussion boards. Second generation, or web 2.0, includes increased interactivity with blogs, wikis, and podcasts (Beldarrain, 2006). Students are required to use web 2.0 tools such as blogs, wikis, and discussion boards, usually through a learning management system (LMS), allowing integration with each other and academics (Masters & Gregory, 2010). Learning management system features are being integrated with virtual worlds to create a blend between the virtual world social environment and online learning. Some of the learning management features are being added to virtual worlds. "Sloodle" is an open source project that develops educational tools in the virtual world environment. Sloodle combines Moodle, the online learning management system, with *Second Life* to allow users to administer quizzes, polls, assignments, and blogging (Boulos, Hetherington, & Wheeler, 2007; Kluge & Riley, 2008). MUVE developers are aware of the trend for using 3D virtual worlds for educational uses. The term massively multi-user online learning environment (MMOLE) is being used to describe a virtual space specifically used for educational purposes (Warburton, 2009).

The affordances of virtual worlds in education include simulations, multiple vantage points, immersion, immediate feedback, semi anonymity, motivation, and engagement (Warburton, 2009). Virtual worlds, VLEs, and immersive virtual worlds (IVWs) show promise toward enhancing, motivating and stimulating learners, especially when the traditional means has failed to do so (Robbins & Butler, 2009). The term "virtual learning environment" is generally identified as a set of learning and teaching tools involving online technology designed to enhance student learning experiences. Immersive virtual worlds provide a wide-range of scenarios in a time and place convenient to the learner. Immersive virtual worlds create an online environment that tends to be more immersive and collaborative than a VLE (Savin-Baden, 2008). Virtual worlds, VLEs, and IVWs provide an "any time" or "any place" educational environment that enhances the learning experiences (Pelet, Lecat, & Papadopoulou, 2011).

Virtual world environments have the capabilities of utilizing CMC tools within a distributed world to allow for collaborative learning opportunities (Delgarno, 2001). A primary reason for studying MUVEs in an educational setting is their ability to create authentic learning conditions that are hard to cultivate in a traditional classroom setting (Dieterle & Clarke, 2007). Literature continues to identify certain traits in virtual worlds that replicate "real-life" learning experiences, such as lecture halls or classrooms (Girvan & Savage, 2010). The same pedagogies can be accomplished through webinars, but there is a need to move the unique characteristics of virtual worlds to more potential for learning (Hancock & Dunham, 2001). Webinars are lecture-based presentations through the internet that project the presenter's presentation and voice to an end user. Virtual worlds provide enhanced interactivity over webinars that allow for immediate,

contextualized feedback and synchronous or asynchronous interaction (Masters & Gregory, 2010). Researchers and designers can create real-world similar situations in virtual worlds that are safe, cost-effective, and targeted toward specific learning goals (Dieterle & Clarke, 2007). The best learning environments are those that are authentic and distributed across internal and external sources and those conditions are often difficult to create in a classroom setting (Dieterle & Clarke, 2007). Learners in virtual worlds have meaningful opportunities to experience life-like social interaction while at the same time engaging in meaningful learning activities (Cooke-Plagwitz, 2008). Children can learn socialization, social interaction, problem solving, literacy, and citizenship in virtual worlds (Subrahmanyan, 2009).

With virtual worlds and distributed cognition, the cognitive process, perception, learning, reasoning, and memory are no longer confined with the individual (Dieterle & Clarke, 2007). Distributed cognition is the idea that learning is not confined to the individual, but spans across the environment. External cognitive artifacts, groups of people, space, and time can all be part of cognitive activity (Dieterle & Clarke, 2007). Interactions between learners and others or course materials can help solve problems and improve progress (Sun, Tsai, Finger, Chen, & Yeh, 2008). Understanding the cognitive distribution can be dispersed physically, socially, and symbolically between individuals, and tools they are using will help in understanding the affordances of virtual worlds (Dieterle & Clarke, 2007). Virtual worlds provide users the ability to act in world. Objects have properties that allow them to be taken, dropped, and manipulated. This allows students the opportunity to learn by doing across the environment and with other learners (Hew & Cheung, 2010).

For the physical distribution, the 3D environment can be an interactive map, a digitized artifact, or the sense of physical presence (Dieterle & Clarke, 2007). Virtual worlds offer aspects of full body appearance and gestures (Franceschi et al., 2009). The avatar presence offers a strong sense of being in the same place with other group members and the possibility to interact with virtual objects with other people at the same time (Franceschi et al., 2009). Teams of students can take part in different segments of the 3D environment and share their findings with one another as part of the experimental simulation (Dieterle & Clarke, 2007).

Play is a necessary activity in a child's development and gaming can have educational benefits in a K-12 classroom (Roussou, 2004). Game-oriented or social virtual worlds appear as video games to children when they first encounter them. Video games involve players participating in communities (Shaffer, Squire, Halverson & Gee, 2004) and success in the game involves ongoing efforts to learn (Oliver & Carr, 2009). Games bring players together both competitively and cooperatively and create new social and cultural worlds that require players to inhabit roles otherwise inaccessible to them (Shaffer et al., 2004). Game-oriented or social virtual worlds help open the possibility of play and learning as a social achievement (Oliver & Carr, 2009). Play allows children to experiment with their surroundings as a form of problem solving, unite imagination in discovery, and learn new things at their own pace (Guth & Helm, 2010; Roussou, 2004). Role-playing possibilities of avatars offer a wide range of group collaboration and experimentation than would not be possible in a physical setting (Franceschi et al., 2009). In virtual worlds, children have the freedom to play with identity and role-play in individual and collective forms (Warburton, 2009). Virtual world spaces such as *Second*

Life or *OpenSim* are not bound by time or geography and offer opportunities for socialization, play, and cooperative learning.

VLEs are better suited for effective online learning collaboration than their text-based counterparts, such as Blackboard or Moodle (Franceschi et al., 2009). Text-based VLE are the least effective in supporting development of engagement, presence, and performance (Franceschi et al., 2009). Virtual worlds are used as communication spaces, simulation of space, and experiential spaces (Hew & Cheung, 2010). Students in the virtual world environment demonstrated significantly higher levels of engagement than compared to face-to-face traditional learning environment (Franceschi et al., 2009). Unfortunately, results in past virtual world research indicates that education only comprises of 12.5% of intended use (Hew & Cheung, 2010).

Virtual worlds have been used in education to create online communities for pre-service teacher training and in-service-professional development (Dieterle & Clarke, 2007). They have been used for engaging science-based activities that may not normally be accomplished in a traditional classroom setting (Dieterle & Clarke, 2007). One example is the Heart Murmur Sim in *Second Life*. The Heart Murmur Sim in *Second Life* puts avatars in a medical simulation with actual heart sounds to simulate heart murmurs for authentic learning experiences.

VLEs can be used to facilitate learning tasks and lead to development of enhanced spatial knowledge (Dalgarno & Lee, 2010). While moving freely around the VLEs, the learner can view objects and the space from any position. Avatars can fly, run, walk, or stand in any place of 3D space. The learner may also manipulate objects, of which may not be possible in traditional learning environments. The virtual spaces can be organized

like the traditional real-world classrooms and can use tools common in the physical traditional classroom. In fact, the virtual classroom often includes traditional classroom tools that are implemented in the 3D virtual space, such as interactive white boards, synchronous chat, voice discussions, slide shows, and application sharing. The virtual classroom can appear to be similar to an actual physical classroom, or it can take on a different environmental theme. For example, learners can be immersed in a virtual jungle and discuss environmental factors of the Amazon; learners from various countries can collaborate on problems such as ecology, democracy, and geography (Dillenbourg et al., 2002); learners can walk down a virtual Champs-Elysees in Paris and practice developing their foreign language with others. Virtual worlds can also place learners in impossible situations, such as inside an atom in order to learn about the elements of atoms. The 3D representation of avatars in an environment where they can interact with one another provides a sense of self and presence with the possibility of resulting in an immersion experience (Hancock & Dunham, 2001).

The representations of the space may have an impact on the learning process (Dillenbourg et al., 2002). For example, in a virtual museum that imitates an actual physical museum, the learners explore the space room by room as they would in an actual museum. The space could be redesigned as a virtual map of painters that illustrates the physical distance between painters. Learners could engage in dialogue to discuss the implications of distance and the painters' works (Dillenbourg et al., 2002). The virtual space can also be organized in virtual rooms according to a series of exercises. As learners progress through the exercises, they can visually see who is also in a room with them and working on the same problem. The learners could then converse about the

exercise. This provides a greater sense of awareness of the task (Dillenbourg et al., 2002).

Game and narrative approaches to learning in conjunction with VLEs can contribute to learner motivation and engagement (Dalgarno & Lee, 2010). Some activities can be engaging so that the mental focus of the individual is shifted away from the surroundings and from the day-to-day stresses, allowing for direct focus on the task (Csikszentmihalyi, 1990). It is likely that learners will become psychologically immersed in the environment. The flow of the learner's experiences may capitalize on the possibility of psychological immersion in the environment. 3D VLEs can be used to facilitate learning tasks and lead to increased motivation and engagement (Dalgarno & Lee, 2010). A learner who may be reluctant to ask questions or comment in class may feel more comfortable in a 3D virtual world because of his/her avatar (Baker et al., 2009). Virtual worlds could actively engage learners who are sometimes hard to "reach" and provide motivation to use the experience in a variety of ways (Merchant, 2009). The avatar can provide an additional layer of semi anonymity which may enable some students to feel more comfortable (Baker et al., 2009). Virtual world environments are socially rich and allow for the learning of social skills, collaborative learning of content, and development of personal relationships among participants (Joshi, 2010). Discussion threads in *Second Life* are recorded in the chat feature and users can reference the recorded dialogue to formulate their ideas prior to commenting on the discussion (Baker et al., 2009). The platform can also provide a more informal platform for interaction between students and between student and teacher (Baker et al., 2009). Educators who

have used *Second Life* for instruction have indicated that communication among virtual students is livelier and more engaged than the FtF classes (Cooke-Plagwitz, 2008).

Virtual worlds encourage playfulness and encourage users to test boundaries (Twining, 2009). Since avatars can walk, run, fly and manipulate objects, physical norms disappear in the virtual space. The learners have little boundaries in the virtual space and may feel empowered to test social norms in the virtual world.

Changes in environmental context can affect memory. Avatars that progressed through the environment will recall vocabulary or context better than avatars that are in a stationary position for the entire learning experience. The difference in the cues and the constant changing environment will significantly affect learner retention of subject matter (Stevens, Leonard, & Hill, 2009). Increased synthesizing presence in online distance education environments can lead to an increase in learning (Tu, 2000).

Avatars are often the visual representation of one's "ideal self" and become virtual extensions of their creators (Cooke-Plagwitz, 2008). Learners are distinguished by their unique identities in the classroom. Avatars are a visual representation of the user, a "tangible" embodiment of their identity online (Ducheneaut, Yee, Nickell, & Moore, 2006). Depending on the virtual world environment, online identities can be similar or different from one another. If a virtual world environment has limited unique avatar identities, it can constrain the learning process because individuals look similar online and it is hard to recognize users based on appearances (Dickey, 2003). Some virtual worlds have advanced avatar customization tools and allow users to enhance the appearance of their avatars. Some students can create disguises of avatars that are unlike their real selves. The disguises often impart confidence in a timid student (Cooke-

Plagwitz, 2008). Since virtual world settings are simulated, learners tend to rely on the affordances of avatars in the environment (Dickey, 2003). Unlike FtF, virtual worlds do not yet capture facial expressions (Franceschi et al., 2009). Virtual world environments currently have weak representations of facial expressions as compared to the subtle nature of real human faces (Franceschi et al., 2009). Companies and research institutes are now designing methods for users to create photorealistic avatars and map real life appearances to avatars (Neustaedter & Fedorovskaya, 1999). Avatar appearances help maintain anonymity while keeping consistency and accountability (Dickey, 2003). Children's avatars mostly mirror offline properties such as gender and interests (Subrahmanyam, 2009). As more and more people are using virtual worlds daily in avatar-based virtual communities, people may begin to break down the traditional definition of identity and self (Hew & Cheung, 2010).

Challenges

One of the most significant challenges with the use of virtual worlds is the use of bandwidth (Wagner, 2009). Most virtual worlds have significant visuals in the constant changing environment, therefore the bandwidth requirement is extensive but computers may be lacking bandwidth requirements on older systems. The minimum technical requirements are beyond the capabilities of the average labs in high schools and colleges, specifically with graphic cards (Baker et al., 2009; Kemp & Livingstone, 2006).

Another challenge is holding meetings with a large group of learners with the learners freely moving about in the space (Wagner, 2009). Many times while meetings are being held, learners do not understand the virtual social norms required to have an

effective large-group meeting. Some schools have disabled the fly function, teleporting, and one-to-one chat to assist the learner in focusing (Merchant, 2009).

There is a high learning curve in navigating in virtual worlds and this can lead to difficulties in managing various technical proficiencies needed to be part of a team (Davis, Murphy, Owens, Khazanchi, & Zigurs, 2008). Anxiety with learning and using 3D VLEs can be challenging as well for learners (Baker et al., 2009). The learning curve to manipulate through a 3D virtual space is significant (Baker et al., 2009). This initial learning process can cause frustration, and cause the learners to reject the learning process. Learners have reported that the downloading process is straightforward, but the learning curve for movement in the space is significantly challenging (Baker et al., 2009).

There may also be a resistance of people taking the environment seriously because it replicates the look of a game (Davis et al., 2008). Staff and students may not accept virtual worlds as a legitimate learning tool (Delgarno et al., 2011). Because the environment has a game-like appearance, the authenticity of the experience may be limit acceptance (Delgarno et al., 2011). Individuals shape their perceptions of virtual worlds based upon their general beliefs of computers and computer use (Venkatch, 2000). Within the environment, there are rich activities and surroundings that may cause distractions to the individual (Davis et al., 2008).

Educators who build the 3D space can often feel overwhelmed with the process and experience self-inflicted burnout (Bell, Peters, & Pope, 2007). Each building, plant, and walkway requires a significant amount of time to build, script, and place in the virtual space. There can be a significant amount of preparation time required for a virtual world learning experience. Educators that are new to building and scripting

objects take more time to build in the space than do seasoned veterans. The building process takes time and new users can often get frustrated easily.

Instructors may also need to develop new classroom management techniques and teaching pedagogies in a virtual world (Baker et al., 2009). Discussions can become complicated when viewing discussion threads and the delay while typing can affect student responses (Baker et al., 2009). Conversations can occur simultaneously and cause confusion (Baker et al., 2009). Managing group discussions will require procedures established prior to the virtual meeting (Baker et al., 2009).

Security issues also need to be considered when using a virtual world environment (Baker et al., 2009). Students may need to be taught appropriate online behavior and privacy safeguards prior to logging on to the virtual world (Baker et al., 2009). Private areas can be established or purchased in virtual worlds, but students in public areas may be subjected to sexual content, violence, or disruptive players while online. The question of liability for a faculty or school comes to light if a student is sexually harassed or verbally assaulted in the virtual world environment (Kluge & Riley, 2008). Linden Labs closed *Teen Second Life* at the end of 2010, which created an additional barrier to usability (Farley, 2011). *Second Life* previously required people who register to be 18 years old, but reduced the age to 16 years old or older (Farley, 2011). *Teen Second Life* was an alternative virtual world for children ages 13 to 17 years (Farley, 2011). In K-12 learning environments, not all students in a classroom may be 16 years old or older and the elimination of *Teen Second Life* provides no alternative for a virtual world experience.

Basic accounts in *Second Life* are free, which allows students to participate with no cost. For an institution to create a learning environment within *Second Life*, a premium account is required. The fee structure is based on virtual space and access restriction. The fees associated with a virtual world can be prohibitive for some schools until the use of the technology can be proved beneficial (Kluge & Riley, 2008). In January 2011, the education discount for *Second Life* was discontinued from Linden Labs and many institutions pulled out of *Second Life* to locate low cost alternatives (Farley, 2011). Educational institutions also started to share virtual space to reduce costs (Farley, 2011). Despite the possible benefits, many teachers have not chosen to adopt virtual worlds because of the complex technical and pedagogical hurdles in order to make use of them in the classroom (Delgarno et al., 2011).

In a study of post-secondary adopters of virtual worlds, 80% of the respondents were either first or second adopters of virtual world technology (Bowers, Ragas, & Neely, 2009). The lack of interoperability between virtual world platforms locks users toward one specific setting. There is no standardization for developers in these environments and locks an investment of time and resources to one platform (Warburton, 2009). Free, open source projects are multiplying and are working to extend and integrate the future metaverse by developing free servers, tools and applications (Hendaoui, Limayem, & Thompson, 2008). The capabilities for virtual worlds have yet to be examined in depth (Davis et al., 2008). *Second Life* is a location where most virtual research has taken place, but findings may not be able to be generalized to other virtual world environments (Yee et al., 2007). Additional research will need to explore other virtual world environments and compare the findings with the *Second Life* research.

Online Learning

Different terminologies have been used for online learning, and it makes difficult to find a definition in consensus (Ally, 2004). Terminologies that have often been used interchangeably with online learning include e-learning, Internet learning, virtual learning, computer-assisted learning, and distance learning (Ally, 2004). Through these terms, researchers and practitioners of online learning tried to denote curricula that are delivered via Internet, partially or entirely, allowing students to participate in learning regardless of geographic location, time, and place (Richardson & Swan, 2003; U.S. Department of Education, 2010; Watson, Murin, Vashaw, Gemin, & Rapp, 2011; Zhang, Zhao, Zhou, & Nunamaker, 2004).

Online learning shares some characteristics with distance education that involves with earlier technology such as radio, television, and videoconferencing (U.S. Department of Education, 2010). Distance education emerged to allow access to those who would not normally be able to participate in FtF courses. Distance education often describes the effort of providing access to learning for those who are geographically distant (Nichols, 2003). The transition of technology utilized by distance learning evolved from computer-based instruction to computer-assisted instruction to video-conferencing (Beldarrain, 2006). In 1956, AT&T developed the technology to allow voice and video to be transmitted simultaneously and by 1992 electronic educational conferences were regularly taking place (Cole, Ray, & Zanetis, 2009). Students could see, listen to, and interact with an instructor in another location and this virtual classroom was limited only by the video conference network (Greenberg, 2004). Video-conferencing is a one-to-many medium that enables participants to synchronously

together virtually in real time for interaction (Knipe & Lee, 2002; Martin, 2008). Improvements in infrastructure and technology have continued to impact online learning opportunities (Cole, Ray, & Zanetis, 2009). Current trends in distance education indicate a shift in pedagogical perspectives with student to student and student to instructor interaction being the focus (Beldarrain, 2006).

The origins of e-learning are not certain; it may have arrived in conjunction with online learning (Moore, Dickson-Deane, & Galyen, 2011). Like the term "online learning", e-learning is also been interpreted in various ways. One definition of e-learning is using technological tools that are web-based, web-distributed, or web-capable for learning (Nichols, 2003). Another definition identifies e-learning as content delivered by CD-Rom, the Internet, Intranet, audio, video, satellite broadcast, and interactive TV (Moore et al., 2011). Higher education tends to refer to e-learning as either software-based learning or online learning (Kidd, 2010). Overall, however, it seems that most researchers and practitioners accept the fact that e-learning can be delivered by various electronic media (Lee, Yoon, & Lee, 2009).

Online Learning in K-12

Online education is popular throughout K-post secondary education. In K-12, reports indicate that 50% or more of all districts across the United States have at least one student taking an online course (Watson et al., 2011). State virtual schools, multi-district online programs, full-time online schools, and single district online programs all have components of online instruction. State virtual schools are governed by the state education agency (Watson et al., 2011). State virtual schools are created by state legislation and typically administered by the state education agency (Watson et al., 2011).

Multi-district online programs can be charter or district-run schools that offer full-time enrollment (Watson et al., 2011). Full-time online schools, or cyberschools, are typically responsible for students' scores on state assessments, local assessments, and attendance (Watson et al., 2011). Single-district online programs use district funds to provide full-time or supplemental instruction to students living within the district (Watson et al., 2011). Online blended learning programs in single districts are currently the fastest growing and largest category of online learning for 2011 (Watson et al., 2011). Most single-district programs combine fully online and FtF components for blended learning, are mostly supplemental with some serving full-time online students, are focused on credit-recovery, are funded primarily through the district, and are primarily focused at the high school (Watson et al., 2011).

Online Learning in Post-secondary

Post-secondary online programs include university and college programs that offer either supplemental or full-time online instruction (Watson et al., 2011). Higher education and corporate training programs were quick to adopt online learning, but K-12 school systems were slow to adopt (U.S. Department of Education, 2010). Universities worldwide now offer thousands of courses online (Zhang et al., 2004). In 2001, MIT committed to making materials from all of its courses freely available on the web for non commercial use (Zhang et al., 2004). In 2002, enrollment in the University of Phoenix Online baccalaureate and graduate-degree programs had a 70% increase from the previous year (Zhang et al., 2004).

Movement

Online learning has developed in conjunction with technology advances and developments of instructional pedagogy (Ravenscroft, 2001). Online learning has not developed in a linear fashion. The first online learning focused on physical classroom instructional content transferred over the Internet (Singh, 2003). The focus was on programming drill and practice and they tended to be a repetition or compilation of online versions of classroom-based coursework (Kidd, 2010; Singh, 2003). Design emphasis was on the external environment and shaped the learner responses through the system interactions (Ravenscroft, 2001). Information was presented in segments, followed by questions and immediate feedback reinforced correct responses (Ravenscroft, 2001). Minor errors like misspellings and semantic substitutions were considered wrong answers and the system did not provide opportunities for reflection or interventions (Ravenscroft, 2001). It involved extensive page-turner student experiences with point and click quizzes with little interaction (Singh, 2003). During this time, educational technology followed a behaviorist approach, with computer programmed instruction (Ravenscroft, 2001).

Advances in technology have caused a shift from contiguous learning groups to asynchronous learning groups, where more emphasis was given to communication through CMC (Kreijns et al., 2003). With the realization that the single mode of instructional delivery, which was the main focus of instruction delivery in the previous period of online instruction, did not provide students with sufficient choices, engagement, social interaction, relevance or context needed to become successful learning online (Singh, 2003) online learning developed to have a more learner-centered design with student control of the curriculum and navigation (Ravenscroft, 2001). Multimedia

influenced education and the educational software reflected constructivist influences with multimedia presentations (Kidd, 2010). Students were able to decide their own path through a topic and follow a learning program that appealed to their learning styles (Ravenscroft, 2001). The Internet became the mode of delivery and web-based training dominated and developed active learner models (Kidd, 2010). Students were encouraged to reflect on their learning experiences, thus relating to the cognitive view of learning.

Contemporary Internet technology provides highly engaging and highly interactive possibilities for communication and learner participation (Ravenscroft, 2001). Online learning developed with increased interactivity, multimedia courseware, constructivist and cognitive models, and social networking developments (Kidd, 2010). In this regards, online learning was treated as a mediational tool to support and promote higher-order thinking skills (Ravenscroft, 2001). In order to promote higher-order thinking , online learning requires challenging activities that enable learners to use their metacognitive abilities to link new information to old (Ally, 2004). It is not the technology used for online learning that makes student learn, but the instructional design and the student interactions (Ally, 2004).

Another approach to online learning blends the delivery modes of instruction. By blending traditional face-to-face and online learning with instruction taking place both in the classroom and online, the online component becomes a natural extension of the traditional classroom learning (Rovai, 2004). The original use of the phrase "blended learning" was associated with linking traditional classroom training with online learning activities (Singh, 2003). The term has evolved to encompass online and offline learning, self-paced and live, structured and unstructured, and practice and performance content

(Singh, 2003). Blended learning opportunities provide more choices and are more effective (Singh, 2003). Research from the University of Tennessee's Physician's Executive MBA program has demonstrated that blended learning programs can be completed in half the time and less than half the expense, using a mix of live online learning, self-paced instruction, and physical classroom delivery (Singh, 2003). The University of Tennessee's Physician's Executive MBA program also demonstrated an overall 10% better learning outcome than the traditional classroom learning format (Singh, 2003).

Today's online learning environments are utilizing advanced class management systems which support web-based instruction, web-based performance support systems, virtual classrooms, and a range of web 2.0 technologies (Smith, Smith, Boone, 2000). Instructional design of course activities and the use of different types of synchronous and asynchronous communication tools encourage student participation and interaction in online learning (Tsai et al., 2008). The Internet has become a dominate means of information delivery (Zhang et al., 2004).

During the 2007-2008 school year, there was approximately a 43% increase of students in K-12 public schools taking online courses in the United States (U.S. Department of Education, 2010). Current research in K-12 online learning indicates that single district programs are becoming the fastest segment of online and blended learning (Watson et al., 2011). More districts are becoming blended, instead of fully online programs (Watson et al., 2011). K-12 online learning is growing rapidly and is starting to merge with traditional FtF learning (Watson et al., 2011).

Benefits and Challenges

Online learning environments provide many benefits including continued education opportunities for individuals in rural areas, increased flexibility for students pursuing education, controlled educational materials, improved flexibility of educational materials, heightened interactivity, reinforced instruction, enhanced communication between students and decreased costs for instruction of students (Smith et al., 2000). Online learning can be either synchronous or asynchronous, but the delivery methods requires contact between students and faculty, collaboration among students using active learning techniques, prompt feedback, and respect for diverse talents and ways of learning (Beldarrain, 2006). The benefits of using CMC tools in the learning process include anytime, anywhere features and multiple ways of communication between students and between students and professors (Alrayes & Sutcliffe, 2011).

Online students using CMC tools like Blackboard, Moodle, and *Second Life* learn just as much as their traditional counterparts who use face-to-face methods (Lester & King, 2009). Studies indicate an overall increase in student participation with online courses, an improved ability to apply the material, an improved ability to make connections, and improved attitudes toward the use of technology with online courses (Smith et al., 2000).

Online learning is being used to expand the range of courses available for students (Watson, 2007). Students in small, rural schools may have limited access to courses that a single school can offer (Watson, 2007). Online learning provides those opportunities to students. Online learning provides scheduling flexibility for students who may face scheduling conflicts (Watson, 2007). Schools are allowing students to take

online courses in addition to a typical high school schedule, allowing them to acquire college credit (Watson, 2007). Students needing remediation courses can also take online courses to acquire additional help (Watson, 2007). Students that are homebound, pregnant, at-risk, or incarcerated are able to continue with their schooling online outside of the classroom (Watson, 2007).

Online learning environments provide users with hypertext-based materials in a synchronous or asynchronous setting with supportive multimedia and interactive features to assist with understanding (Beasley & Smyth, 2004). The ability to present course material in a non-linear fashion makes the hyper texting an ideal medium to develop critical thinking skills. Asynchronous learning allows students to reflect on materials and their responses before responding, unlike a traditional classroom (Richardson & Swan, 2003). Students have the ability to work at their own pace (Richardson & Swan, 2003). In Smith, Smith, and Boone (2000), the data supported that lectures when conducted in an online learning environment were as effective as lectures presented in a traditional classroom. Guided instruction when provided in an online learning environment was as effective as in the traditional classroom. Student participation increased when instruction was presented in an online format.

The reasons why some students are less satisfied with distance education are not clear (Rovai, 2004). Factors such as isolation, time management problems, and limited accessibility to materials are frequently cited as factors influencing students' perceptions on online education and lead to frustration and anxiety (Rovai, 2004). Learner attitudes toward computers are also an important factor, and computer anxiety can affect learning (Sun et al., 2008). Inadequately equipped systems can lead users to frustration, confusion

and reduced interest (Zhang et al., 2004). Some students are unable to effectively manage their learning activities and make effective use of resources in the open, online environment (de Valle & Duffy, 2009). The higher quality and reliability of the technology, the higher the learning will be (Sun et al., 2008).

In one large-scale study (n=1,056), there were eight factors found to be barriers to students in online learning (Muilenburg & Berge, 2005). They include administrative issues, social interaction, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the Internet, and technical problems (Muilenburg & Berge, 2005). These problems can lead to higher dropout rates, low motivation of students to learn and lower student satisfaction with the learning experience (Muilenburg & Berge, 2005). Delayed modeling requires that the learning have a cognitive function and information recall abilities due to the time delays (Tu, 2000). In asynchronous learning, the absence of a role model requires the learner to rely on their own memory guides (Tu, 2000).

There are higher dropout rates for online education students over traditional programs by as much as 10-20 percent (Tsai et al., 2008). The dropout rate of those enrolled in an online course is as high as 50 percent, with some studies roughly estimating that students enrolled in online courses are twice as likely to dropout as on-campus students (Brooks, 2003). Online courses require more time dedicated to the course than the traditional face-to-face session. Other reasons include limited support, students being unfamiliar with the technology, and a sense of isolation (Brooks, 2003; Tsai et al., 2008). There is also a high dropout rate if there is not sufficient student support. Students may feel they are alone in the cyber classroom (Brooks, 2003). A

student who lacks the technical skills to navigate through the course may also quickly become frustrated and leave the program (Brooks, 2003). Online learning requires students to have strong problem-solving skills because the mode of the instruction relies on independent activities (Oh & Lim, 2005).

Students may become active participants with CMC, but the quality of the learning experience may not prove CMC beneficial. For example, although there is evidence of an increase in the quantity of discussions in online classrooms using the synchronous conferencing tool, Liu et al.'s research (2003) indicates mixed results in the quality of the discussions through the synchronous conferences. Students may post more words online with CMC, but there is not necessarily an increase in students' usage of challenging words during the discussion. Linguistic consequences by the student participants, such as missing accent marks and simplified verb conjugation, can occur (Kern, 1995).

The most open platforms from a content-creation perspective also require the most expensive hardware, which can limit accessibility (Collins, 2008). Access is still problematic for those with disabilities (Anderson, 2004). Screen reader software is not always reliable and may cause problems for students with vision disabilities. Certain types of learners can become disoriented and may miss some of the information because the hypermedia context can become problematic for some students (Oh & Lim, 2005).

The growth of online education has outpaced educational policy and the controversies surrounding effectiveness and legalities are starting to emerge (Watson, 2007). Funding is still an issue for school districts, particularly with the online charter schools (Watson, 2007). Some parents, administrators, educators and legislators may not

fully understand the benefits of online learning (Watson, 2007). They are in positions to make decisions to improve the learning opportunities for children, but if they do not understand the capabilities, they may be more hesitant to adopt online learning (Watson, 2007).

Online learning has advantages over traditional FtF education, but concerns such as time, labor intensiveness and material resources exist (Sun et al., 2008). The U.S. Department of Education (2010) identified in its meta-analysis that there are few published studies contrasting online learning environments with FtF conditions for K-12 students. In an extensive initial search from 1996-2006, there were no experimental or controlled quasi-experimental studies that compared learning effectiveness of online and FtF instruction for K-12 students (U.S. Department of Education, 2010). When extending the search to include a time frame to July 2008, only five published studies met the meta-analysis criteria (U.S. Department of Education, 2010). In the meta-analysis of mostly post-secondary students, students in online learning environments performed modestly better, on average than the same material in a traditional FtF setting (U.S. Department of Education, 2010).

Educational Theories Supporting Online Learning

Educational technologies have advanced in conjunction with the popular learning theories of the time. As new educational technology develops, the focus remains on increasing student learning. To fully understand the history and development of educational online learning, one must also understand the learning theories they support. The behavioral, cognitive, and constructivist schools of learning theories can be used as a taxonomy for online learning (Ally, 2004). Behaviorists' strategies can be used to teach

the facts. Cognitive strategies can be used to teach the processes and principles. Constructivist strategies can be used to teach higher-order thinking (Ally, 2004).

Behavioral Learning Theory

The behaviorist learning theory dominated educational learning theories up until about 20 years ago (Boghossian, 2006). Behaviorism states that learning as an observable behavior is more important than understanding internal activities (Siemens, 2004).

Behavioral learning theory focuses on modifying the learner's behavior and provides instruction that involves a presentation of information, a question to seek a response, and either positive reinforcement or repetition for a correct response. Mastery is thus acquired through smaller, gradual steps (Lewis & Chen, 2010).

In a traditional behaviorist theory, learners undergo forms of conditioning (Boghossian, 2006). The goal of the conditioning is to produce a behavioral result (Boghossian, 2006). This is particularly difficult to measure in an academic setting, where changing behavior is harder to measure than in a physical setting, where one can observe physical behaviors (Boghossian, 2006). In the academic context, behaviorists substitute verbal behavior for the physical behavior (Boghossian, 2006). A student's correct response to a question would constitute successful conditioning and the reinforcement would be good grades (Boghossian, 2006). The form of conditioning in a behaviorist perspective is lecture-based pedagogy (Boghossian, 2006).

Contemporary behaviorists view learning as a response to the environment and assumes that behavior of students is in response to the past and present experiences (Tomei, 2010). Valid knowledge is publically observable, and behaviorists reject the

idea of internal mental states (Boghossian, 2006). Learners are told about the world they live in and they are expected to replicate what they are told (Boghossian, 2006).

Behaviorists believe that knowledge focuses on external observations between and among outwardly observable stimuli and the responses to the stimuli (Boghossian, 2006). Teachers believed that the best way to learn was through repetition, a principle of the behaviorist learning theory. Behaviorists view students as unreflective responders (Boghossian, 2006). Students are engaged in the educational process only when displaying the appropriate verbal behavior (Boghossian, 2006). Behaviorists consider learning as a change in observable behavior by external stimuli in the environment (Ally, 2004). The observable behavior indicated whether the learners learned something and not what was going on inside their head (Ally, 2004). The behaviorists view the mind as a "black box," in that a response to a stimulus can be observed quantitatively, disregarding the thought processes occurring in the mind (Ally, 2004). This mindset looks at external indicators of learning (Ally, 2004).

Early computer learning systems were designed on a behaviorist approach of learning (Ally, 2004). Tutorials with the behaviorist view of learning included drill and practice, with an emphasis on automatic responses and repeated reinforcement (Delgarno, 2001). Behaviorism applies in early online learning (Salt, Atkins, & Blackall, 2008) and navigating through a virtual space.

Cognitive Learning Theory

Cognitivism takes an information processing model, with learning as a form of inputs, managed by short-term memory and coded for long-term recall (Siemens, 2004). The model developed after a need to understand how prior knowledge is constructed and

new information is processed in an individual's memory (Tomei, 2010). Cognitive psychologists focus on the learner as the active component of the teaching-learning process.

Cognitive psychologists view learning as an internal process with memory, thinking, reflection and metacognition as essential elements; the amount one learns depends on the processing capacity of the learner. Effort, as well as the depth of the processing, also influences the amount of learning (Ally, 2004). This cognitive view of learning places importance of the learner's cognitive activity and the mental schema they develop (Delgarno, 2001). With the cognitive learning theory, it is more important to apply instructional methods that encourage students to free-up processing resources that may cause cognitive load (Merriënboer & Ayers, 2005). Learning takes place by assimilating new information into existing cognitive structures. Cognitive learning theory is the foundation of constructivism (Lewis & Chen, 2010).

Constructivist Learning Theory

The constructivist learning theory identifies that individuals gradually build their understanding of the world through experience, maturation, and interaction with the environment (Rovai, 2004). The learner is an active processor of information (Rovai, 2004). Knowledge is the product of many learner-centered processes that include social communications and group collaboration (Dixon & Dixon, 2010). Drawing from Piagetian and Vygotskian accounts, the social constructivist perspective focuses on the interdependence of social and individual processes in the co-construction of knowledge (Palincsar, 1998). Learners construct knowledge for themselves, and each learner

constructs knowledge individually as he or she learns (Hein, 1991). Constructing meaning is the basis for learning.

Constructivist learning allows learners to learn with authentic tasks and provide real-world learning environments that encourage learners to take an active role (Tomei, 2010). The cognitive demands are authentic to the tasks in which the student is being trained (Rovai, 2004). The results of one study indicate that an online course designed and delivered based on a constructivist epistemology can be highly effective (Rovai, 2004). To a constructivist, each student's experience is just as important as anyone else's and no one has a privileged viewpoint (Boghossian, 2006). There is no objective criteria for what constitutes knowledge, so what may be knowledge to one person may not be knowledge to another because two people may not have the same subjective experiences (Boghossian, 2006).

Knowledge develops as one engages in dialogue with others (Palincsar, 1998). In online learning, students have opportunities for conversation and dialogue as a mode of learning. Online learning environments promote an interactive style of learning, opportunities for collaboration, and meaningful engagement across time and space (Riner, 1996). Learning environments are meaningful when the participants engage together and create a community of social practice (Bronack et al., 2006). Effective learning environments must support learners as each learner becomes a part of the community through communication and co-construction (Bronack, Riedl, & Tashner, 2006).

Constructivist learning experiences are characterized by increased student responsibility, opportunities for reflection, focus on realistic tasks, collaboration with

peers, and exposure to multiple perspectives, and course materials that go beyond abstract descriptions (Beasley & Smyth, 2004). Discussion board activities can be used to facilitate a constructivist learning environment in an online setting (Rovai, 2004). Topic-based discussions, role-playing, and peer critiques can create an interactive and cooperative learning environment (Rovai, 2004). Knowledge-building communities have the potential to build collaborative strategies with mentors and role models, open classroom structures, role reversals and interactions with an audience. As students interact with the tools and objects in the online learning environment, the interaction allow the learners to construct their own understanding and meaning (Coffman & Klinger, 2007). Group work can contribute to the development of a collaborative environment that values constructivist approaches (Rovai, 2004).

The two most important aspects of the constructivist online learning environment is the authenticity of the learning environment and the concept of "distributed cognition" (Beasley & Smyth, 2004). In a virtual world environment, students are presented with 3D objects and are "closer" than sometimes in the real world. The authenticity of the experience enables students to think critically, beyond abstract images or descriptions in text. With distributed cognition, tools and artifacts within the environment can enhance the cognitive ability of the individual (Beasley & Smyth, 2004). Within a virtual world, students are able to manipulate objects in a 3D space and interact with their learning environment. The multimedia provides unique ways to learn and demonstrate understanding.

Learners need to have opportunities for exploration and manipulation with the learning environment and conversation and discourse opportunities between learners

(Dickey, 2003). This allows the learners to share information, test their understanding and reflect on their own learning (Dickey, 2003). Virtual worlds do not offer the full potential for immersion as virtual reality, but research indicates evidence of the potential settings for constructivist learning (Dickey, 2003). When learners have the opportunity to display their work and discuss it in a virtual environment, the role reversal for learners provides opportunities for peers to teach one another in group problem solving (Dickey, 2003).

Language Learning

Introduction

Language is a distinguishable factor that separates humans from other animals. Humans and animals are able to develop sound patterns and sound sequences. The element that separates humans from other animals is that humans are able to identify the sound patterns and the meanings those patterns and sequences represent. The knowledge of sound patterns in a language includes knowing sounds that start a word, end a word and the sounds that follow each other. Language consists of all sounds, words, and sentences one constructs for meaning (Fromkin, 1983).

Stages of Language Acquisition

Knowledge of a language enables one to combine words to form phrases and then sentences in order to properly interact with native speakers. When an individual learns a language, he or she must learn something finite, but with an extensive vocabulary that can be stored in long-term memory. There are different stages to language learning, with variables that depend primarily on the individual's age.

One of the first stages of first language acquisition is babbling. Babbling produces a large amount of sounds and infants are typically developing the physical movement capabilities in conjunction with their oral functions to make babbling sounds. Children who are deaf also babble; therefore, babbling does not depend in the presence of acoustic auditory input. Babbling for infants and children is typically the first stage of sound formation and the beginning of first language development. The holophrastic stage is when children use one-word sentences to communicate. The two word stage is when children start to develop patterns into sentences (Fromkin, 1983).

To teach children a first language is to help them know how sounds (phonology), words (lexicon), and sentence formation (syntax and semantics) are combined to develop expressions. To help children learn content in a first language, one must use clear and concise articulation, make eye contact, use visuals, employ gestures, body movement, pantomime, use shorter and simpler sentences at a slower rate, use high-frequency vocabulary and eliminate idiomatic expressions. One also has to model, scaffold, access, and activate student's prior knowledge, provide cooperative learning strategies, differentiate instruction (Hill & Flynn, 2006).

Language Acquisition Theories

There are different first language acquisition learning theories. The early idea of first language learning was that language was imitative. Johann Herder, German Philosopher, held the view that children discover the rules of grammar. He explained that children learn the intricacies of language before the age of 5, yet children are not taught language the way they are taught arithmetic (Fromkin,1983). Arithmetic has a formulaic approach to learning, whereas grammar and language is experimental during everyday

communications. Children do not typically begin and end with their learning and experimenting with their first language. In order to communicate properly, children must continually experiment with the language.

First, the behaviorist learning theory identifies language learning as a stimulus-response-reinforcement procedure. The basic element of learning in the behaviorist view is that one will be provided a stimulus, will respond to the stimulus and will receive either a positive, negative, or neutral reinforcement based on the response (Hill & Flynn, 2006). An example of this would be a child learning the word "apple." If the child wants an apple and correctly uses the word "apple," a positive reinforcement response would be to give the child an apple after his/her correct use of the word. The stimulus for the child would be to have an apple. The response from the child would be to correctly use the word "apple" and the positive reinforcement would be to provide the child with an apple. In first language learning acquisition, behaviorists believe that children learn their languages through a series of stimuli, responses, and reinforcements.

The innatist theory identifies that language can only be accounted for by an innate, biological language acquisition device or system. Innatists believe that children construct grammar through a process of hypothesis testing (Hill & Flynn, 2006). An example of the innatist theory with children is that children will use incorrect words in their vocabulary to an adult to form a sentence. A child may say, "the dog *are* wagging her tail." The child would revise his/her sentence to "the dog *is* wagging her tail" after an adult corrects the original hypothesis sentence. This series of sentence constructs and corrections develop a child's form of grammar development. The innatist theory

identifies that children will gradually revise their hypothesis to accommodate exceptions in rules, such as plurals (Hill & Flynn, 2006).

The interactionist theory identifies that caregivers play a critical role in adjusting language to facilitate the use of innate capacities for language acquisition (Hill & Flynn, 2006). The interactionist view takes into consideration the importance of both nature and nurture in the language acquisition process. Interactionists study the language mothers use when caring for infants and young children and the special modifications they make during the social interactions. Caregivers usually facilitate children's vocabulary development, their ability to use language appropriately, and their ability to get things done through language (Hill & Flynn, 2006). This is evident when caregivers teach children to say "mama" or "dada." The social interaction is positive and encouraging. The child is typically rewarded for saying either of those two words, even though the child does not understand the semantics behind either word. Interactionists view that children's language develops over time and interactions do not necessarily lead to immediate understanding.

First Language

A student's first language is the language he or she first learns while developing as a child. If a child in the United States was raised with the English language, then his/her first language would be English. If another child was raised in the United States with Spanish as the first learned language, then his/her first language would be Spanish. The first language differs from a foreign language or a second language.

Foreign Language

A foreign language is one that is learned in a place where the language is not typically used for ordinary communication. A foreign language is learned for context outside of the community that speaks it (Littlewood, 2004). For example, a student living in the United States would study French as a foreign language while still living in the USA. Foreign language learners are disadvantaged because they are surrounded by their native language and they must seek out opportunities to practice the target foreign language. The foreign language student typically only receives practice in the target language in the classroom setting and does not have the opportunities of a second language learner. Foreign language learners tend to lack daily practice opportunities of the target language. This makes the students less likely to increase their perceived competence, willingness to communicate and frequency of their communications in the target language (Baker & MacIntyre, 2000).

Second Language

Second language (L2) refers to any language that is learned when the first language is already put in place (Littlewood, 2004). Researchers make a distinction between second language and foreign language. A second language has societal functions in a community where it is learned. For example, a second language is learned while in the specific community of language speakers. A French immigrant to the United States would learn the second language of English while living in the USA. Students in a second language learning environment have the benefit of an immersion opportunity (Baker & MacIntyre, 2000). This means they have more contact with the target language and they receive stimulation which is necessary to master communication in the target

language (Baker & MacIntyre, 2000). Second language learning uses discrete elements of the communication codes, such as grammar rules and pronunciation (Dörnyei, 2010). Second language is also taught socially and culturally, which makes language learning a social event that requires multiple incorporation of elements (Dörnyei, 2010). Research in second language learning over the past two decades has focused on quasi-experimental and experimental studies addressing the effectiveness of instructional treatments in L2 classrooms (Norris & Ortega, 2000). Theories of second language learning fall into two categories: cognitive processes and the context (Littlewood, 2004). Cognitive strategies enable the learner to utilize the language material in direct means through reasoning, analysis, notes, summaries, synthesis and outlining (Oxford, 2003). Students may reorganize information to develop stronger connections, practice the language development in naturalistic settings, or formally produce sounds for practice (Oxford, 2003). Metacognitive strategies are critical for managing the learning process as a holistic experience (Oxford, 2003). Metacognitive strategies have a significant, positive and direct effect on cognitive strategy use and in task completion (Oxford, 2003).

Learning a Foreign Language

The term "language" needs elaboration, specifically in the area of the goal of learning a foreign language. In the early days of foreign language learning, the goal was primarily to develop grammar and vocabulary in the terms of language elements (Littlewood, 2004). Recent development in linguistics and the related disciplines have developed a much wider conceptualization of knowledge and abilities that foreign language learners need to acquire. The current goals of communication competence in the foreign language cover five competencies (Littlewood, 2004). First, students need to

develop a linguistic competence which encompasses the knowledge of grammar, vocabulary, semantics and phonology. This has traditionally been the focus of foreign language learning. Second, students need to have a discourse competence which allows the students to speak and engage in continuous conversation. Students who receive intensive listening training before they begin speaking and repeating tend to develop a stronger command of the foreign language and a better pronunciation (Allen & Valette, 1977). Third, students need to have a pragmatic competence which allows the foreign language learners to use their language skills to convey and interpret meaning when they encounter gaps in their knowledge of the language. Fourth, students need to develop sociolinguistic competence, which teaches them how to use the language appropriately in social situations. Fifth, students need to develop socio-cultural competence, which identifies the background knowledge and cultural assumptions that can affect meaning in communications (Littlewood, 2004).

There is a popular belief that adults are worse at learning a language than children. This is supported in the professional literature which highlights the critical period hypothesis. This hypothesis states that individuals past a certain age are worse at learning a foreign language than younger individuals. This decline in ability does not suddenly occur, but it will begin gradually from ages 6 or 7 to 16 or 17. Children learn their native dialect completely because they rely on language-specific mechanisms of implicit learning. Learners with a high verbal ability can use explicit learning mechanisms to bypass the inefficient mechanisms. This means that children will use their strong skills, such as a high verbal ability, to avoid inefficiencies with written grammar. The ultimate attainment of a foreign language was strongly correlated with the

age of acquisition for people who started acquiring the language before age 17. This indicates that the critical period for learning a second language is to begin learning the language prior to the age of 17. The biggest change may be around the age of 20, where research indicates a significant decline of vigilance (DeKeyser, 2000).

Foreign Language Acquisition Theories

Foreign language acquisition learning theories can relate to how people learn first languages. First language acquisition is a universal achievement and researchers use first language acquisition as an ideal model. Early theorists identified techniques for foreign language learning such as sound acquisition, grammar, vocabulary listening comprehension, learning to talk, learning to write, and learning to read (Naimen, Frohlich, Stern, & Todesco, 1978). A later proposed classification followed the identified techniques that places learning strategies under two groupings; strategies that directly affect learning and processes that contribute indirectly to learning (O'Malley & Chamot, 1990).

Behaviorist views dominated the educational practice and heavily influenced the methods of teaching foreign languages in schools in the 1960's. There was an emphasis on drill and practice with grammar and sentence structures with an audio lingual method, where dialogues are presented on tape for students to memorize, followed by pattern drills to practice. Students are first taught to listen and speak, and then read and write, based on the assumption that this is the natural sequence of language acquisition. For behaviorists, the process of foreign language acquisition involves imitation, repetition, and reinforcement of grammatical structures. Errors are recited immediately to avoid forming bad habits (O'Malley & Pierce, 1996).

The innatist perspective of foreign language learning identifies that language learners creatively construct the rules of the foreign language in a manner similar to first language acquisition. It identifies a distinct difference between acquiring and learning a foreign language. Acquisition is a natural language development process that occurs when the target language is used in meaningful interaction with native speakers, in a manner similar to first language acquisition with no attention to form. Acquisition learning cannot be "turned on" and is only acquired language that is available for natural, fluent communication. Language is acquired (not learned) by understanding input that contains linguistic structures that are just beyond the acquirers current level of competence (O'Malley & Pierce, 1996).

The interactionist perspective states that comprehensible input is necessary for foreign language acquisition. They view there is a communicative give and take of natural conversations between native and nonnative speakers as the crucial element of the language acquisition process. Interactionists are interested in how non native speakers use their knowledge of the new language to get their ideas across to achieve communicative goals (O'Malley & Pierce, 1996).

Theories in reading in a foreign language have changed since the mid 1970s from a bottom-up model to models that describe reading as an interaction between bottom-up and top-down processes. Bottom-up refers to the decoding of individualistic linguistics on the printed page, working from smaller to larger words and phrases to obtain meaning. Top-down models begin with the reader's hypothesis and predictions about the text and his or her attempts to confirm them by working down to the smallest units of the printed text. Readers that may be weak in one strategy might rely on other processes to

compensate for their weakness. For foreign language learners, top-down models do not fit the process for reading unless the learners are already proficient readers. Top down emphasizes higher level skills, such as predicting meaning with context clues. Interactive models of foreign language learning integrate the top down and bottom up models. The interaction between the reader and the text, the interplay between lower and higher level reading processes, and the relationship between form and function in texts can provide a balance (O'Malley & Pierce, 1996).

Research in foreign language learning over the past two decades has focused on quasi-experimental and experimental studies addressing the effectiveness of instructional treatments in foreign language classrooms (Norris & Ortega, 2000). Theories of foreign language learning include: starting at the cognitive processes and starting at the context (Littlewood, 2004). Cognitive strategies enable the learner to utilize the language material in direct means through reasoning, analysis, notes, summaries, synthesis and outlining. Students may reorganize information to develop stronger connections, practice the language development in naturalistic settings, or formally produce sounds for practice. Metacognitive strategies are critical for managing the learning process as a holistic experience. Metacognitive strategies have a significant, positive and direct effect on cognitive strategy use and in task completion (Oxford, 2003).

Cognitive and Metacognitive Approaches

Cognitive

Foreign language acquisition cannot be understood without addressing the interaction between language and cognition (O'Malley & Chamot, 1990). In cognitive learning theories, individuals are said to process information in a series of mental

processes. Since language is a complex cognitive skill, cognitive approaches are more directly related to the individual learning tasks (Brown & Palincsar, 1982). Cognitive psychology studies have focused on determining the effects of strategy training on different kinds of tasks and learners. Strategy training can be effective in improving performance of students on reading comprehension and problem-solving tasks (O'Malley & Chamot, 1990).

There are three stages of skill acquisition in language learning and they include the cognitive, associative, and autonomous stages. Learning begins in the cognitive stage. Learners are instructed, observe an expert with examples, and attempt to figure out and study on their own during this stage (Anderson, 1985). The cognitive stage is a conscious activity on the part of the learner. In the associative stage, two changes occur with respect to the development of the learner's development of proficiency. First, errors of the stored information are gradually detected and eliminated. Second, connections of the various elements or components are strengthened. Declarative knowledge is turned into a procedural form of skill acquisition (Anderson, 1985). Performance in this second stage begins to resemble experts, but individuals may still be slower and may include some errors in their proficiency. The last stage, the autonomous stage, is when performance becomes increasingly fine-tuned. The execution of the skill becomes automatic and errors that previously limited performance begin to disappear. As students become proficient in a foreign language, comprehension increases and utterances are produced with little difficulty. This skill performance between the cognitive, associative, and autonomous stages is gradual (Anderson, 1985).

Cognitive strategies in language learning include peer to peer dialogue, rehearsal or repeating what has been heard, organization and grouping of words or concepts, inferences to predict outcomes or complete missing parts, summarizing what one has heard to ensure retention, using visual images to understand and remember information, and elaboration to link ideas to new information (O'Malley & Chamot, 1990). Peer to peer dialogue can mediate foreign language learning (Swain, Brooks, & Tocalli-Beller, 2002). Peer to peer dialogue can occur when learners are involved in writing, speaking, listening or reading (Swain et al., 2002). The source of the cognitive functions are social, and the external activities which the learner participates can transform to mental interpsychological processes (Swain et al., 2002). The process of internalization is mediated through interaction (Swain et al., 2002). In a collaborative dialog, learners work together to solve problems and the co-construction of knowledge develops during the linguistic exchange (Swain et al., 2002). The language is a cognitive tool to process meaning-making and the social tool to communicate with others (Swain et al., 2002). In peer to peer collaboration students' accuracy improved in verb tense from 58% to 78% and morphology from 35% to 84% (Swain et al., 2002). The learner pairs spent more time on task and it resulted in more accurate performance (Swain et al., 2002).

Metacognitive

Metacognitive thinking involves thinking about the learning process, planning for learning, monitoring of comprehension or production while it is taking place, and self-evaluation after the learning activity has been completed (O'Malley & Chamot, 1990). Memory related strategies can help learners' link foreign language items together, but they may not induce a deep understanding (Oxford, 2003).

Strategies in metacognitive thinking include selective attention for special aspects of a learning task, planning the organization of written or spoken words, monitoring comprehension for information, and evaluating comprehension after completion of a language activity (O'Malley & Chamot, 1990). By pairing cognitive and metacognitive strategies, students can maximize their success of language acquisition (O'Malley & Chamot, 1990). Not everyone learns a foreign language easily and people learn additional languages at different speeds (Grigorenko, Sternberg, & Ehrman, 2000).

Language Learning Strategies

Students deploy a number of language learning strategies, sometimes to merely complete the task requirement set by the teacher, instead of getting the most out of the learning experience (Macaro, 2006). Females tend to utilize different strategies more than males (Macaro, 2006). Cultural groups also vary in their use of strategies for language learning (Macaro, 2006). Experienced language learners may use a different set of strategies from an inexperienced group of language learners (Macaro, 2006). Training students on language learning strategies can promote successful learning of the language if it is carried out over lengthy periods of time (Macaro, 2006). Teaching strategies can help bring a controlled attention to the purpose of adoption of the foreign language (Macaro, 2006). Strategies can be difficult for certain learners to utilize while learning the language. Repeating the language processes in the working memory enables the structural changes to start to take place in long term memory. The changes together with repeated activation lead to skill development (Macaro, 2006).

Linguistic development from skilled instructors utilizing a variety of verbal routines and techniques to guide learners in the communication is widely regarded as the

key focus of language learning (Meskill & Anthony, 2005). Attention and awareness are identified as the two cognitive processes that mediate input and language development while learners are interacting with one another (Mackey, 2006). Mastery of language involves taking a different identity and culture of the target language (Baker & MacIntyre, 2000). The students' attitudes toward the target language will affect the success in learning the target language (Baker & MacIntyre, 2000).

Motivation in Language Learning

Empirical research demonstrates that students' positive attitudes toward their language teacher can be linked to motivation and achievement in the classroom (Noels, 2001). Teachers' drive, teaching style, and manner in presenting content and providing feedback are associated with student motivation (Noels, 2001). An effective language teacher communicates goals of the learning, clear instructions and emphasizes the activity's value to students, both presently and in the future (Noels, 2001). Student evaluations of their rapport with their L2 teacher and class are also linked with student linguistic self-confidence and anxiety (Noels, 2001).

Gardner's (1985) model of motivation makes a distinction between integrative and instrumental motivation (Baker & MacIntyre, 2000). Gardner's (1985) socio-educational model of motivation proposes that motivation is based on a large part on inter-group attitudes and an attraction to the target language and culture (MacIntyre, MacMaster, & Baker, 2001). Motivation can be a characteristic of the individual or an internal attribute (MacIntyre et al., 2001). A second perspective of motivation is that motivation is an external attribute and can be created by some external force or reward (MacIntyre et al., 2001). The hybrid perspective between the two is that motivation can

be an internal attribute that is a result of an external force, and motivation must be a characteristic of the individual and it cannot be created out of nothing (MacIntyre et al., 2001). A teacher can arouse motivation by using an external force in attempt to motivate students, but the potential to be motivated lies with the individual (MacIntyre et al., 2001). Foreign language learners have less contact with the target language and may feel less of a need to integrate with that group (Baker & MacIntyre, 2000). Immersion students might be more motivated because they are more committed with the language in order to attain a level of proficiency (Baker & MacIntyre, 2000). Motivation is a key factor that influences the rate and success of L2 learning (Baker & MacIntyre, 2000). Motivation can be the driving force to initiate learning and also be a main component of sustaining learning when situations become difficult (Baker & MacIntyre, 2000). Motivation is also able to compensate, or even override for a deficiency or effects in aptitude (Baker & MacIntyre, 2000).

Language Proficiency

Language proficiency can be defined as the ability to use a language effectively and appropriately throughout the range of social, personal, school, and work situations required for living in society. Language proficiency includes both oral and written language. Educators want students to become proficient in four language processes: listening, speaking, reading and writing. Language proficiency includes grammatical rules to convey meaning and knowledge of social conventions of language use. The term "communicative competence" is often used instead of language proficiency to emphasize that language extends beyond grammatical forms (Cummins, 1984).

Oral language assessment aims to capture a student's ability to communicate for both basic communicative and academic processes. Conversational interactions are typically context-embedded and occur in a meaningful social context with many para-linguistic cues. They tend to be cognitively undemanding and call for relatively familiar language tasks. Academic language proficiency is the ability to make complex meanings explicit in either oral or written modes by means of language itself. Foreign language learners take less time to acquire a language for basic communicative purposes than for academic purposes (Cummins, 1984).

Language proficiency is a continuum of task difficulty within the context in which the language occurs. The context of language use can vary in time and place. Academic tasks can be cognitively demanding, but in a consistent context. Outside the classroom, cognitive tasks can be undemanding, but significant for task performance.

Computer Assisted Language Learning

Computer Assisted Language Learning (CALL) is the search and study of applications of the computer in language teaching and learning (Levy, 1997). Early practioners used acronyms such as CAI (computer-aided instruction), CAL (computer-assisted learning), CELL (computer-enhanced language learning), and TELL (technology-enhanced language learning) (Gruba, 2004). It has also gone by the names ENFI (electronic networks for interaction), NBLT (network-based language teaching), CACD (computer-assisted class discussion), or CMFLC (computer-mediated foreign language communication) (Abrams, 2006). CALL is now the widely accepted acronym concerning studies that combine language learning and computer technology (Gruba, 2004). CALL's origin and development traces back to the 1970's and has since

developed into a symbiotic relationship between the development of technology and pedagogy (Joshi, 2010). The main objective in CALL is to use the computer to improve the learning capacity of those learning a language (Gruba, 2004). The definition focuses particularly on language learning, not necessarily language teaching (Gruba, 2004). The use of the computer forces a reconsideration of the roles of the stakeholders with the technology (Gruba, 2004). CALL is possible through the interdependent relationship between computer, students, and teachers (Gruba, 2004). The use of the technology influences the student activities, which influences how a teacher may create the learning environment (Gruba, 2004). Computers allow language teachers the bring the language and culture as close and as authentic as possible to the students in the classroom (Gruba, 2004).

CALL utilizes the computer to assist in language teaching and language study. Most CALL programs utilize hypertext, digital video and audio, and network communications to provide simple language teaching. The accelerated pace of technology provides new possibilities for design and research in CALL (Pujolà, 2002). Amidst all the changes in technology, integration and evaluation of CALL remains the same to focus on the teacher and the learner (Pujolà, 2002).

CALL started around the 1970's in the United States of America (Calvo, 1997). The Time-Shared, Interactive, Computer Controlled Information Television (TICCIT) project at Brigham Young University in 1971 was one of the first examples of multi-media based instruction (Levy, 1997). The computers had the capacity to integrate text, audio, and video, with the control lying with the learner (Gruba, 2004). The early uses of computers in foreign language learning consisted of an extension of the textbook, with

computers as a rote memorization tool. The computer and software technology was "programmed instruction" and did little more beyond the classroom experience. The capability of the technology superseded what it was actually completing cognitively in the classroom. Most of the software programs are drill-practice and tutorial in nature, amounting to little more than electronic textbooks (Kleinman, 1987). The drill-practice educational strategy attempts to promote learning through repetitive memorization of facts or vocabulary. Drill-practice may provide foundational knowledge, but it is boring for the learner and provides little cognitive challenges. In the 1970s-1980s, CALL was structural in nature and the role of the computer was an information carrier, or tutor. The behaviorist theory of learning took central precedence, with the learner being dependent on the technology (Gruba, 2004).

The earlier programs in the 1980s typically included a single type of language learning activity. This included text restructuring, gap-filling, speed reading, simulation, or vocabulary games (Ma & Kelly, 2006). The range of the capabilities was small because the computers were less powerful and language teachers did not have a sufficient background on programming to design the program for the pedagogical purpose (Ma & Kelly, 2006). From the 1980s through the 1990s, CALL was theoretically developed as a workstation, with the computer providing communicative exercises. Information processing theory and the constructivist learning theory drove instruction to have an interactive and discover-based learning experience (Gruba, 2004).

The 1990s had an increasing use of computer technology and language exams (Bachman, 2000). Advances in the technology made it possible to design tests according to ability level of individual test takes (Bachman, 2000). The increasing availability of

computers and increasing person familiarity with the use of computers made it possible to administer more computer language exams on a large scale (Bachman, 2000). The advances of multimedia and web technology offer the potential for designing and developing computer-based exams that are more authentic and interactive than a traditional paper and pencil exam (Bachman, 2000). The growing availability of the Internet has allowed CALL instructors to move away from stand-alone workstations and toward networked computers (Gruba, 2004). In the twenty-first century, CALL puts the learner at a more collaborative status. The computer is a source of information management and a toolbox for learning. Learning is collaborative and foreign language acquisition is developed through social interaction (Gruba, 2004). The computer environment can create a social space where users have purposeful interactions through a virtual environment (Gruba, 2004).

Results in an often cited early CMC study published by Warschauer in 1996 showed that students participated more equally in a CMC discussion than in a FtF interaction (Abrams, 2006). It also demonstrated that shy students and students who had low fluency perceptions were more likely to interact during CMC sessions than in FtF classroom settings (Abrams, 2006). The students' language in the CMC discussions was more formal and utilized more complex words than during a FtF discussion (Abrams, 2006).

Technology may drive the curriculum in a language learning environment, but as Salaberry (2001) argues, the technological tool has shadowed its pedagogical purpose. It is not the technology, but the contribution it can make to teaching and learning that determines the usefulness of CALL (Nerbonne, Dokter, & Smit, 1994). The quality of a

CALL program comes from the methodology behind it, rather than the technology itself (Ma & Kelly, 2006). Studies utilizing technology in the classroom indicate increased motivation, mastery of basic skills, a student-centered learning environment, and engagement in the learning process (Stepp-Greany, 2002). Students also appear to gain confidence in their learning because they become learning navigators. Computer-assisted language learning environments encourage creative interaction in a rich learning environment with supportive databases and reference materials (Bland, Noblitt, Armington, & Gay, 1990). Research on language learning using CMC environments at the K-12 level is less extensive and exploration of virtual worlds is rare (Zheng, Young, Wagner, & Brewer, 2009). Virtual world environments show many opportunities for collaboration and conversation in foreign language learning. A practical example is the Language Village pilot project (Koenraad, 2008) where 13-14 year old learners explored a virtual space and focused on situational conversation. The simulation placed learners in virtual settings such as shops, restaurants and tourist sites. The learners' jobs were to communicate via their avatars and carry out realistic conversations in the secondary language, which was French in this case. The project ran for three weeks where the learners spent two lessons in a face-to-face environment and two sessions in the virtual world. According to the survey result and teacher observations, the majority of learners thought the project was interesting and encouraged them to spend more time than usual on their work. The teachers observed an increase in motivation with more learners engaged and on task. The key point to the teacher observations was that the learners seemed to feel less inhibited in foreign language conversation while being in a virtual

environment (Koenraad, 2008). It is critical for the educator to find the technological tool which enhances the educational environment (Salaberry, 2001).

In the above example, the teachers used the virtual world as a means to complement the face-to-face lessons. When technology drives the curriculum, the technology tool tends to not complement the learning objectives. Virtual worlds can be seamlessly integrated into the face-to-face classroom as well as the asynchronous online classroom. The virtual world technology is one tool K-12 educators can utilize in order to provide meaningful, effective education. Virtual worlds carry significant potential because they allow creators to target specific skills and educational objectives, while creating a meaningful collaborative space with learners at the center of their own learning (Sykes, Oskoz, & Thorne, 2008). One needs to vary the instructional conditions to bring different types of learning outcomes.

In virtual worlds, learners are placed in an immersive atmosphere that may not be physically or financially possible for the classroom. The concept of immersion has long been proved valuable in language learning. Immersion is then a role-based experience with an authentic context (Slator et al., 1999). Virtual worlds may be the only possibility to recreate an immersive language learning environment for the classroom teacher. The success of a technology-driven activity will likely depend on a successful accomplishment of pre- and post-activities than on the technology activity itself (Salaberry, 2001). An effective means of integrating virtual worlds with language learning and activating prior knowledge is to build a series of vocabulary terms that are common in conversational language. The educator can provide or conduct a class conversation on commonly used conversational words in the foreign language. This will

serve as activating prior knowledge before engaging in actual conversation in the virtual environment. The educator would then review those terms and prepare learners verbally to engage in conversational foreign language dialogue. One successful application with the chat window and language learning is that the entire conversation in a virtual world can be saved as well as printed for later discussions. Learners may be unsure of specific phrases or words during a conversation in the virtual world environment. The conversation history allows for the educator and the learners to post-discuss the experience and the various conversations, which took place in the virtual space. Following the virtual world integration lesson, the educator would review unclear phrases or words with the learners. The virtual world experience allows the learners to communicate with less inhibition in foreign language conversation. The use of an avatar provides a layer of anonymity, which may enable some learners to interact more freely and speak up during conversations (Baker et al., 2009).

The main role of a teacher in an online learning environment is to encourage student participation and act as a coordinator for students (Meskill & Anthony, 2005). In foreign language learning, specific elements of the instructional conversation between teacher and learner are distinct because they are part of the target instruction (Meskill & Anthony, 2005). The dynamics of a live language classroom are complex and this can transfer to the online learning platform (Meskill & Anthony, 2005). Sociocognitive demands on the part of learners and teachers are high because learners must attend to the new information while rehearsing a response and instructors must orchestrate communications while scaffolding teachable moments (Meskill & Anthony, 2005). CALL is a forum that allows real time communication to be compensated through a set of

affordances for language learners and teachers (Meskill & Anthony, 2005). Real-time target language meaning, processing, rehearsing, and production is a daunting task for the language learner (Meskill & Anthony, 2005). CALL allows learners to see the language for as many times as needed, for as long as they wish, without disruption of the conversation (Meskill & Anthony, 2005). By having the time to see the language, and have an opportunity to reflect, use resources, compose and edit their responses, students in foreign language acquisition have opportunities to respond appropriately (Meskill & Anthony, 2005).

One study reported that 92% of CMC messages in a Portuguese class were posted by the students in contrast to what may typically happen in a FtF classroom (Meskill & Anthony, 2005). In electronic discussions in a French class, students produced 85-88% of the total number of sentences, while live discussions produced 37-60% of the total discussions (Meskill & Anthony, 2005). In an oral discussion study, 65% of all turns taken in an oral discussion were by the French teacher in a traditional FtF setting, whereas only 15% of the turns taken were by the French teacher in the CMC environment (Meskill & Anthony, 2005). Lastly, 82-84% of the total words in FtF classes were produced by the instructors and in the online classroom, they only produced 6-14% of the total words (Meskill & Anthony, 2005).

As an accompaniment to live language classes, CALL can be stopped, studied, attended to, and effective teaching strategies employed by foreign language teachers (Meskill & Anthony, 2005). The medium provides learners additional time they may need to process the instructional moves and develop their own responses (Meskill & Anthony, 2005). CALL can positively modify teacher-centered models of instruction in

the language classroom by encouraging students to interact with one another, rely less on their native language, and use a variety of discourse functions (Abrams, 2006).

CALL technology can encourage development of independent learning characteristics in high school students learning French (Sanaoui & Lapkin, 1992). Students indicated they felt positive because the CALL provided a low-anxiety situation and there was more student control in the classroom (Beauvois, 1998). In a previous study (Beauvois, 1994), many students expressed an increase in confidence in speaking. The use of technology can redistribute the attention on the task and make students more active participants in their own learning (Hartman et al., 1995). Learners view the computer as a medium through which they can make meaning through interaction with others while completing a certain task (Stepp-Greany, 2002).

CALL can be beneficial to language learning because it provides a private, stress-free environment. Students are able to access nearly unlimited information, practice language skills at their own pace, and receive instantaneous feedback (Neri, Cucchiarini, Strik, & Boves, 2002). In order to get even the most hesitant students to engage in talking, teachers should create a stress-free environment. Communicative tasks in a foreign language environment have been shown to create the highest levels of anxiety for students (Neri et al., 2002).

According to the interaction theories of language learning, the most significant impact on successful language acquisition is input (Neri et al., 2002). Students must be able to access a large amount of input so that their target models are developed. A factor that can stimulate learner engagement is to present users with accommodations to various learning styles. This includes presenting input in written form, aural form, and audio-

visual form (Neri et al., 2002). The capability of collecting data while students are interacting with the computer is another advantage to CALL (Chappelle & Jamieson, 1986). Studies have indicated that student learn better when they have immediate responses for correct answers (Chappelle & Jamieson, 1986).

Student Engagement

Student engagement refers to the initiation of cognitive, emotional, and behavioral aspects of student investment and attachment to education (Caraway, Tucker, Reinke, & Hall, 2003; Skinner, Wellborn, & Connell, 1990; Tucker et al., 2002). Student engagement is when students are reflectively involved in deep understanding, valuing what they are doing, and actively participating in the school and classroom (Munns & Woodward, 2006). The term engagement is reserved for learning situations where multi-dimensional components are present at the same time (Munns & Woodward, 2006). Student engagement captures the multi-dimensional cognitive, emotional, and behavioral components in classroom work (Munns & Woodward, 2006).

Early work on engagement overemphasized one-dimensional definitions of the term, focusing on one of the three components: behavioral, cognitive, or emotional. Student engagement research focused on the observable indicators related to student engagement, for example academic indicators or student behaviors in class. Less research focused on the psychological indicators of engagement (Appleton, Christenson, Kim, & Reschly, 2006). Previous engagement studies do not view the many constructs as parts to a whole (Harris, 2008; Munns & Woodward, 2006).

Recently, researchers have agreed on a multi-dimensional interpretation of engagement that acknowledges the behavioral, cognitive, and emotional components of

engagement in a simultaneous manner (Yonezawa, Jones, & Joselowsky, 2009). Engaged learners are thought to be more involved behaviorally, intellectually, and emotionally in school and when presented together can improve learning outcomes (Appleton et al., 2008; Banger-Downs & Pyke, 2002; Masters & Gregory, 2010; Yazzie-Mintz, 2007). All three categories are equally as important (Harris, 2008), but current research does not yet identify how the three types interact (Boykin & Noguera, 2011).

One model of the multi-dimensional construct of student engagement is the Finn Model. The Finn Model identifies student engagement as an ongoing cyclical process (Marks, 2000). The model identifies engagement largely on the individual and omits the possible influences with the school organization (Marks, 2000). Measures with the Finn Model include the number of schools the student attended, the quality of teacher-student relationships, student perceptions of popularity, and student views on academics (Libbey, 2004). Student engagement leads to academic success, which positively influences identification with school and thus increases the likelihood of future engagement (Marks, 2000).

A second model of student engagement is the motivational model of engagement (Miserandino, 1996). The motivational model of student engagement suggests that children who believe that effort is important to a task and that they have the ability of exerting the effort tend to be more actively engaged in classroom activities (Miserandino, 1996). Engagement is the extent of the social context where energized behavior, positive emotions, and positive orientations toward goals are all characteristics of engaged children. High engagement leads to increases in the level of skills and abilities. The motivational model of engagement identifies an individual's belief of ability, effort, and

luck can cause their engagement in school. The individual's thoughts and emotions while performing an action are more important in determining engagement than the actual outcome of the action. Studies have shown that despite a positive outcome, such as success on an assessment, participants lose their engagement if their autonomy is compromised (Miserandino, 1996).

A third model of student engagement is the expectancy-value model. The expectancy-value model identifies three motivational components that are linked to student learning and engagement. The three motivational components are the expectancy, value, and affective components (Pintrich & De Goot, 1990). The expectancy component evaluates student beliefs about their ability to perform a task. Students who are more engaged in school are likely to perform and persist through a task (Pintrich & De Goot, 1990). The value component reviews student goals and beliefs about the importance of a task. Students who value and believe they can complete classroom tasks will likely have a stronger motivational orientation and will engage in more metacognitive activities (Pintrich & De Goot, 1990). The affective component is the student's emotional reactions to a task. Text anxiety is a common emotional reaction related to the perceptions of competence (Pintrich & De Goot, 1990).

Impact of Student Engagement on Learning

By high school, 40% to 60% of students in urban, suburban, and rural locations are reportedly disengaged from school. This does not include the number of students who have already dropped out of school (Klem & Connell, 2004). According to one source, student engagement directly affects academic achievement (Klem & Connell, 2004). Students who are engaged in the classroom are more likely to learn and to find the

educational experience rewarding (Marks, 2000). Student engagement is a more significant factor than the amount of instructional time for the lowest-achieving groups of students (Boykin & Noguera, 2011). Higher levels of engagement in school link to improved performance (Klem & Connell, 2004). Evidence suggests that student engagement is a reliable predictor of student outcomes in social studies, math, and language achievement (Leithwood & Jantzi, 1999).

Self-efficacy or teacher behavior indirectly influences school success (Tucker et al., 2002). Students who are more engaged in the classroom activities receive more positive teacher attention. Teachers will be more neglectful to students who show lower levels of engagement. In effect, teachers are likely to provide additional energy to highly engaged students and will diminish engagement to low engagement students (Boykin & Noguera, 2011). This effect provides low engagement students with less teacher attention when they actually need more than the students with higher levels of engagement.

Student Engagement and Computer Mediated Communication

Computer activities provide intellectual challenges and motivate students to seek solutions to various problems. The point is to capitalize on the processes that naturally elicit student engagement rather than making students force themselves to pay attention (Reeve & Halusic, 2009). The more students find an academic subject intrinsically interesting, or relating to their own personal goals of values, the more a student is likely to invest in the learning (Roeser, Strobel, & Quihuis, 2002). Computer activities can provide students with relevant projects and challenges that combine student interests with academic subjects.

The Apple Classroom of Tomorrow (ACOT) program found broad evidence of increased student engagement in academic work (Becker, 2000). First, computers were used only as a set of tools rather than the central learning mode (Becker, 2000). Second, computer use was not a separate application of the curricular focus, but integrated as part of the curriculum (Becker, 2000). Third, teachers emphasized the computer as a "tool," rather than utilizing the computer for drill-and-practice activities (Becker, 2000). Fourth, teachers were willing to give responsibilities to students to determine specific learning tasks and how to accomplish them (Becker, 2000). The focus of the project was on the student engagement and student academic success, not the technology.

Student Engagement in Virtual Worlds

The virtual gaming industry views engagement as a situation where an individual's attention is completely focused on a task (Franceschi et al., 2009). Engagement is a tool in the gaming industry to sustain a person's interest in a game in order to increase the game's popularity and associated income (Franceschi et al., 2009). Engagement in virtual worlds creates a greater sense of immersion and develops a level of presence (Sallnäs, 2005).

In social, open-culture virtual worlds, the different experiences may result in a different source of educational engagement (Franceschi et al., 2009). The users are not limited on narratives or a fixed fantasy setting like gaming virtual worlds and social virtual worlds give the users capabilities to create their own unique experiences (Franceschi et al., 2009). Users that create open-culture educational virtual worlds tend to be more ad hoc and thus appear less engaging than the game industry counterparts (Franceschi et al., 2009). Virtual worlds feel more life-like than a text-based chat, so

students and faculty find *Second Life* easier to become engaged in the experience (Cooke-Plagwitz, 2008). Virtual worlds, such as *Second Life*, present a realistic virtual space with visible classmates, giving students a sense of participation and belonging to a community (Cooke-Plagwitz, 2008).

One of the goals in an educational virtual world environment is to transport the user to an artificial environment during an experience (Franceschi et al., 2009). Presence can be considered a key element in virtual worlds and research on virtual presence is focused on the design elements to enhance the sense of presence in a virtual environment (Franceschi et al., 2009). The sense of presence refers to the psychological sense of being in a virtual environment rather than a real-world location (Franceschi et al., 2009). A user is engaged in an activity in the virtual world environment is capable of developing a sense of presence in the virtual environment (Franceschi et al., 2009). One of the goals of educational virtual worlds is to create a sense of shared space and time with a sense of presence (Davis, Murphy, Owens, Khazanchi, & Zigurs, 2009).

Engagement has an impact on all dimensions of behavioral, emotional, and cognitive elements of presence and a users' sense of presence is continuously changing while interacting in the environment (Franceschi et al., 2009). While participating in a virtual environment, the users' sense of social presence depends on the extent of the user's interactions with the others in the virtual group (Franceschi et al., 2009). The social nature of educational practice influences students' motivation to learn, ways of participating, negotiation of meaning, and how new learning shapes self-identity. Online learning environments are social contexts, just like FtF, with technology as the mediator within the environment (Tsai et al., 2008). The virtual environment must be designed to

convey an element of group presence to allow for movement and gestures from avatars (Franceschi et al., 2009). In one research study, users felt a greater sense of presence in the virtual environment when there was feedback and avatars were virtually touching one another during communication (Franceschi et al., 2009).

As technology has improved, people experienced higher levels of presence in educational virtual worlds, to the point that some reported being immersed in the environment (Davis et al., 2008). Beyond the visual appearances dimension, an important contributor to realistic behavior is the avatar's ability to interpret verbal and nonverbal cues from others (Davis et al., 2008). Immersion is a related element to presence and is achieved when a user interacts with the virtual environment and is exposed to a stream of stimuli that captures his/her full attention (Franceschi et al., 2009).

Dimensions of Engagement

There are three major components of student engagement; behavioral, cognitive, and emotional (Appleton et al., 2008; Caraway et al., 2003; Harris, 2008; Jimerson, Campos, & Greif, 2003; Roeser et al., 2002; & Tinio, 2009). Each dimension comprises of only one part to a more complete picture of the multidimensional aspect of student engagement. The following sections describe each dimension of student engagement as a single component, but must be considered as one part to the whole picture of evaluating student engagement in school.

Behavioral

Behavioral engagement is represented by the student participation in their academic, social and curricular activities (Harris, 2008). Behavioral engagement has common components; behavior related to learning, behavior toward compliance, and

participation in school extra-curricular activities (Tinio, 2009). Attendance, suspensions, voluntary classroom participation, and extracurricular participation are variables that represent behavioral components of engagement (Appleton et al., 2008). The behavioral dimension of student engagement includes a student's observable actions or performances, like participation in extra-curricular activities, completion of homework, grades, grade point average and scores on achievement exams (Jimerson et al., 2003). In the Yazzie-Mintz (2007) study, the high school survey on student engagement identified that 50% of children surveyed identified being bored in school every day. The study addressed behavioral engagement to include participation in extra-curricular activities, student interactions with other students, and student interaction with their community.

Cognitive

Cognitive elements of student engagement include cognitive strategy use, attention, task mastery, and a preference toward challenging tasks (Caraway et al., 2003). Cognitive engagement is associated with how much a student will invest in school and how much motivation he/she has in school. This includes the feeling of significance toward academics, getting good grades, and finishing tasks beyond what is expected (Tinio, 2009). Cognitive engagement is present when students make a personal investment in their learning by being focused, strategic, and self-regulating (Harris, 2008).

In Appelton et al. (2006), a study was conducted to measure the cognitive and emotional elements of student engagement. Participants included 1,931 ninth graders in a large, diverse urban school district of nearly equal males and females. The Student Engagement Instrument (SEI) was used to measure student levels of cognitive and

emotional engagement. The factors of student-teacher relationships, peer support for learning, future aspirations and goals, family support for learning, and extrinsic motivation had a positive correlation with academic variables such as GPA or standardized test achievement. This development scale identifies student-teacher relationships, peer support, family support, and extrinsic motivation to have positive cognitive and emotional elements of engagement (Appleton et al., 2008).

Emotional

Emotional engagement involves the positive and negative reactions of a student toward school and people. It analyzes the degree at which a student cares about school, belongingness, safety in school, pride, and relationships (Tinio, 2009). Emotional engagement is considered to exist with students when they have a positive attitude toward school, their peers, their teachers, and learning (Harris, 2008; Jimerson et al., 2003).

Managing body image and social standing with peers becomes important to young adolescent students and academic concerns are viewed as secondary (Roeser et al., 2002). Students that are successful addressing non-academic issues, such as making friends, having peer groups, and feeling good about their bodies, may make students more mentally healthy and capable of investing in learning more than students with emotional difficulties (Roeser et al., 2002).

Measures of Student Engagement

Despite the student engagement subtypes, measurements of the subtypes are still debatable (Betts, Appleton, Reschly, Christenson, & Huebner, 2010). The SEI is a student self-report measure survey completed on paper to identify five subtypes of student engagement. The five subtypes include academic, behavioral, time on task,

attendance, and homework completion (Appleton et al, 2006). The 4-point, 33-item scale addressed the five subtypes with .72-.92 reliability and Appleton et al. (2006) demonstrate construct validity using a confirmatory factor analysis (Fredricks et al., 2011). The SEI instrument is primarily used with middle school and high school students in pubic K-12 education.

The Rochester Assessment Package for Schools- Student Self-Report (RAPS-S) is a single score measuring overall engagement based on 16 items. The RAPS is considered to be the most common measure of cognitive and emotional engagement (Fredricks, 2003). The RAPS is a diagnostic instrument to provide information about the current status of student engagement from both the teacher and student perspective. The RAPS-S is the most extensive of the measures and is a student self-report that references student engagement, student beliefs about school, student beliefs about self, and student perceptions of interpersonal support with .68-.77 reliability (IRRE, 1998). The second measure is the RAPS-T and is a brief teacher measure identifying student engagement with .87 reliability (Fredricks et al., 2011). Significant positive correlations a reported on students' scores on the engagement scale and academic achievement (Fredricks et al., 2011). Teachers assess student academic performance accurately, sometimes better than standardized measures (Banger-Downs & Pyke, 2002). In the RAPS-T, teachers identify levels of student engagement for each student in the classroom. Learning engagement has not only a cognitive component, but also a motivational one, and Banger-Downs and Pyke (2002) identify that teachers rate behavioral and cognitive engagement with different success rates. By supplementing the RAPS-T with additional measures of student engagement, one will be better able to identify levels of engagement. Both of the

instruments are available in forms for the elementary and middle school levels. No separate high school versions of the RAPS are available, but the middle school versions have been used successfully in high school evaluation projects (IRRE, 1998). The RAPS engagement scale has been administered to 200,000 students since 1997 (Murray, 2009).

Past research has focused on academic performance as an indicator of student engagement. Many items that measure student engagement and academic performance include quantitative, cognitive data. Indicators for academic performance and student engagement include the student's grade point average (GPA), achievement test scores, and completion of homework (Jimerson et al., 2003). This information is compiled by teachers, such as local test data and homework completion. In addition, school records are utilized to identify GPA and standardized test scores on state examinations. Some studies use student self-reports for students to rate their own view of their academic performance (Jimerson et al., 2003).

Summary

Virtual world environments can provide opportunities in CMC for simulations, immersion, motivation and engagement. They provide a promise toward enhancing the curriculum and stimulating learners by providing enhanced communication capabilities, while offering anytime, anywhere learning. The virtual world provides a constructivist learning environment where one can engage with dialogue with others and construct knowledge. The element of social presence in the virtual world creates a meaningful environment where participants can engage in discourse (Bronack et al., 2006). CMC in virtual worlds provides learners the time to think of responses that may not be possible in the traditional FtF classroom. For the foreign language learner, CMC and virtual worlds

allow for real-time target language practice without the disruption of the conversation (Meskill & Anthony, 2005). In an L2 classroom, virtual worlds can create an immersive environment where learners are engaged in the learning (Coffman & Klinger, 2007). Virtual worlds can create environments that are possibly as engaging as the FtF counterparts, while still providing time in CMC to practice language development (Csikszentmihalyi, 1990). Class discussions over a computer network can increase collaboration and discourse. The lack of nonverbal cues can be both a benefit and a challenge in online learning.

The U.S. Department of Education identified the lack of studies comparing online learning environments with FtF conditions for K-12 students (2010). Students using CMC tools learn just as much as their traditional counterparts (Lester & King, 2009). Past studies indicate student engagement in CMC, but they are primarily focused on post-secondary education. Student engagement is commonly referenced, but under researched (Harris, 2008) and the majority of research focuses on academic and behavioral engagement (Appleton et al., 2006). Research on student engagement needs to analyze all three forms of student engagement: cognitive, emotional, and behavioral (Russell et al., 2005) in the K-12 classroom.

CHAPTER III

METHODOLOGY

Introduction

The use of computer technology for foreign language learning is reported to increase one's self-esteem, preparedness, language proficiency and overall academic success (Dunkel, 1990). Student self-esteem and overall academic success are linked to student engagement in school. One way to predict and improve academic achievement is to identify student engagement. Identifying the three areas of student engagement in school can assist in creating a positive learning environment where students experience increased opportunities for academic success. The purpose of this study was to evaluate student engagement in the high school foreign language classroom and determine if a virtual world learning environment impacts student engagement, under the multidimensional constructs of emotional, cognitive, and behavioral criteria.

This dissertation research examined the differences in student engagement between the virtual world and the traditional face-to-face learning environments in high school foreign language classrooms. One of the primary purposes of this study was to determine if there are differences in overall student engagement between learning in a virtual world setting versus a traditional face-to-face setting while learning a foreign language. Another purpose of this study was to determine if there are group differences in the multidimensional constructs of student engagement. Student engagement is identified as having emotional, cognitive, and behavioral components (Gambone, Klem, Moore, & Summers, 2002; Gambone, Klem, Summers, Akey, & Shipe, 2004; Klem & Connell, 2004; Murray, 2009).

The first research question was: "When practicing conversational foreign language, are there differences in reported student engagement between in the virtual world and in the traditional face-to-face environments?" To answer this research question, high school foreign language classrooms participated in a quasi-experimental survey. Student engagement was measured using the Research Assessment Package for Schools (RAPS), student and teacher editions using a six-point interval scale. The independent variables were the virtual world and face-to-face settings. The dependent variable was student engagement, with the constructs of emotional, behavioral, and cognitive elements.

Since student engagement is a multidimensional construct, the next series of research questions compare group differences in the emotional, cognitive, and behavioral components of student engagement with the group environments of the virtual world and face-to-face setting. The second research question was: "Are there significant group differences of emotional engagement between the virtual world and the face-to-face environments while learning a foreign language?" In this question, the independent variables were the virtual world and face-to-face educational settings. The dependent variable was emotional engagement, with the covariates being cognitive and behavioral student engagement. To address the second research question, the same pre- and post-intervention survey data was used for analysis.

The third question was: "Are there significant group differences of cognitive engagement between the virtual world and face-to-face environments while learning a foreign language?" In this question, the independent variables were the virtual world and face-to-face educational settings. The dependent variable was cognitive engagement,

with the covariates being emotional and behavioral student engagement. To address the third research question, the same pre- and post-intervention survey data was used for analysis.

The fourth question was: "Are there significant group differences of behavioral engagement between the virtual world and face-to-face environments when learning a foreign language?" In this question, the independent variables were the virtual world and face-to-face educational settings. The dependent variable was behavioral engagement, with the covariates being cognitive and emotional student engagement. To address the fourth research question, the RAPS-TM results were used. The survey results were used to identify behavioral components of student engagement.

SPSS Statistics Standard Version 20.0.0 will be used for data analysis. To answer question one, a MANOVA analysis was performed. To answer question two, an ANCOVA analysis, controlling for the cognitive and behavioral covariates was performed. To answer question three, an ANCOVA analysis, controlling for the emotional and behavioral covariates was performed. To answer question four, a *t*-test analysis was used.

Participants

Institutional Review Board (IRB) Approval

All research conducted at, or sponsored by, Duquesne University that involves human subjects must be approved by the IRB before research begins. IRB permission was granted for the execution of this study on April 26, 2012. The approval document is found in Appendix A.

School District School Board and Administrative Approval

The Pennsylvania Code §4.13 states "School entities will adopt policies to assure parents and guardians that they have the right to have their child excluded from research studies or surveys conducted by entities other than a school entity unless prior written consent has been obtained" (1 Pa. Code § 4.13). The district's policy number 235 states guidelines for student rights and responsibilities consistent with the Pennsylvania Code. Surveys conducted by outside agencies, organizations, and individuals are to be approved by the Board, based on the Superintendent's recommendation, prior to administration to students (Student Rights/Surveys, 2007). The parent or guardian was informed of the nature and scope of the individual survey and the relationship to the educational program of their child and the parent was notified of their right to inspect, upon request, the survey created prior to administration or distribution to a student (Student Rights/Surveys, 2007).

A meeting was scheduled on April 17, 2012 with the school district Superintendent to discuss the study. Following approval from the superintendent, the study was brought to the School Board on April 19, 2012. School Board approval was granted on April 19, 2012 at the regularly scheduled school board meeting.

Selection of Participating Classes

One criterion was used in this study to determine the classes selected to participate. The criterion for participants was students in grades 9-12 currently taking a foreign language class. This study examined the use of virtual worlds and traditional FtF educational settings when learning a foreign language. Students in the same levels of a foreign language were able to participate in either a traditional face-to-face setting or a

virtual world setting, regardless of the actual language being learned. The student groups were similar in grade configurations and levels of experience in the target language. Since this study sought to identify student engagement in a virtual world and traditional FtF environment, students needed to have technological knowledge to utilize, if necessary, in a virtual world environment. Elementary level and middle level students are not introduced to virtual worlds and may not have the prerequisite skills necessary to act in the environment.

Parental Permission

A letter was created (Appendix B) to explain the nature and scope of the study and notify parents and guardians of the contents of the policy, their rights to review the survey, dates of survey instrumentation, and the procedures for opting out of participation. This letter was sent home with prospective students participating in the study, along with the permission form to participate (Appendix C).

Setting

The study was conducted in a public high school setting in southwestern Pennsylvania. The target district was a rural school district of 203 square miles of 1,911 students (District, 2012). The classes were offered during the traditional school day.

Instrumentation

An existing instrument, the Research Assessment Package for Schools (RAPS) was adapted for the study. RAPS has been used as a K-12 assessment measure for student engagement (Skinner, Wellborn, & Connell, 1990; Murray, 2009; Klem & Connell, 2004; Caraway, Tucker, Reinke, & Hall, 2003; Pierson & Connell, 1992; Tucker et al., 2002). The RAPS is considered to be a common measure of cognitive and

emotional engagement (Fredricks, 2003). When reviewing K-12 research on student engagement, the RAPS was the common questionnaire in quantitative studies (Skinner, Wellborn, & Connell, 1990; Murray, 2009; Klem & Connell, 2004; Caraway, Tucker, Reinke, & Hall, 2003; Pierson & Connell, 1992; Tucker et al., 2002). The RAPS is a diagnostic instrument to provide information about the current status of student engagement from both the teacher and student perspective. The RAPS-SM is a student self-report that references student engagement, student beliefs about school, student beliefs about self, and student perceptions of interpersonal support (IRRE, 1998). RAPS-TM is a brief teacher measure identifying student engagement. Both of the instruments are available in forms for the elementary and middle school levels. No separate high school versions of the RAPS are available, but the middle school versions have been used successfully in high school evaluation projects (IRRE, 1998).

The three items that comprise the RAPS-TM student engagement composite have an alpha reliability of .87 (IRRE, 1998). The alpha reliabilities of the RAPS-SM have a reliability of .79 (IRRE, 1998). Validity coefficients represent the strength of the associations between predictor variables and criterion variables. The RAPS Manual (IRRE, 1998) reports significant ($p<.0001$) positive correlations between engagement measures and student performance. Significant positive correlations are also reported between the engagement scale and high school academic performance (IRRE, 1998).

The instruments that were used to collect data for the four research questions are listed below:

1. Research Assessment Package for Schools (RAPS-SM)- 1998 Edition

This survey instrument provided data for research questions one, two, three, and four of this study. The instrument measures psychological and interpersonal processes with student engagement. This survey was a modified 84-question self-report measure (IRRE, 1998).

2. Research Assessment Package for Schools (RAPS-TM)- 1998 Edition

   This survey instrument provided data for research questions one, two, three, and four of this study. The instrument is a teacher reported survey to acquire teacher reported levels of student engagement that is combined with student reports of their own engagement. This survey was a modified four-question survey completed by teachers (IRRE, 1998).

Research Design

This section covers the research design of the study, including the variables that were used in the study. Independent and dependent variables are listed with each research question. Dependent variables include question items and the questions that are reversals. The scoring procedures are also explained in the research design.

Independent variable for Research Question 1: The independent variable was the classroom learning environment with two levels, virtual worlds and face-to-face learning environments. Virtual world and face-to-face learning groups were separated and were instructed in either the virtual world or traditional face-to-face environments.

Dependent variables for Research Question 1: Dependent variables were the emotional, cognitive, and behavioral components of student engagement. Student engagement was measured by the RAPS-SM, and the RAPS-TM. The 84 items of the RAPS-SM were combined to create a composite score for emotional and cognitive

student engagement domains as shown in Table 1. Item reversal scores were obtained by subtracting each individual's student score on that item from seven. Dependent variables were measured in comparison to the pre-intervention survey.

A single summary score was derived for the RAPS-TM four-item teacher report. Since the second item was worded negatively, reflecting a lack in engagement, ratings were reversed by subtracting each student's score from seven. The student engagement composite score will be then created by obtaining the mean of the four items.

Independent variable for Research Question 2: The independent variable was the classroom learning environment with two levels, virtual worlds and face-to-face learning environments. Virtual world and face-to-face learning groups were separated and were instructed in either the virtual world or traditional face-to-face environments.

Dependent variables for Research Question 2: The dependent variable was emotional engagement, controlling for covariates of cognitive and behavioral student engagement. There were 72 items of the RAPS-SM to create a composite score for emotional student engagement domains as indicated in Table 1. Item reversal scores were obtained by subtracting each individual's student score on that item from seven.

Independent variable for Research Question 3: The independent variable was the classroom learning environment with two levels, virtual worlds and face-to-face learning environments. Virtual world and face-to-face learning groups were separated and were instructed in either the virtual world or traditional face-to-face environments.

Dependent variables for Research Question 3: The dependent variable was cognitive engagement, controlling for covariates of emotional and behavioral student engagement. There were 14 items of the RAPS-SM that were combined to create a

composite score for cognitive student engagement as indicated in Table 1. There were two reversal questions. Item reversal scores were obtained by subtracting each individual's student score on that item from seven.

Table 1

RAPS-SM Domains and Questions

Domains	Questions
Emotional Student Engagement	1, 3, 4*, 6, 7*, 8*, 9, 10, 12*, 13*, 14*, 15, 17*, 18*, 19, 20*, 22, 23, 24, 25*, 26, 27, 28, 29*, 30, 32*, 33, 34, 35*, 36, 37*, 38*, 39, 40*, 42, 43, 44*, 45, 47*, 48, 49, 50, 52*, 53*, 55, 56*, 57*, 58, 59*, 61*, 62, 63* 64, 65, 66*, 67*, 68, 69, 70*, 71, 73, 74*, 75*, 76*, 77, 78*, 79*, 80, 81, 82
Cognitive Student Engagement	2, 5, 11, 16, 21*, 31, 41, 46, 51, 54*, 60, 72, 83, 84

Note. Question numbers with an * are reversal questions.

A single summary score was derived for the RAPS-TM four-item teacher report. Since the second item was negatively worded, reflecting a lack in engagement, rating on this item was reversed by subtracting each student's score from five. The student engagement composite score was then be created by obtaining the mean of the four items.

Independent variable for Research Question 4: The independent variable was the classroom learning environment with two levels, virtual worlds and face-to-face learning environments. Virtual world and face-to-face learning groups were separated and were instructed in either the virtual world or traditional face-to-face environments.

Dependent variables for Research Question 4: The dependent variable was behavioral engagement.

A single summary score was derived for the RAPS-TM four-item teacher report. Since the second item was negatively worded, reflecting a lack in engagement, ratings on this item were reversed by subtracting each student's score from five. The student engagement composite score was then created by obtaining the mean of the four items.

Procedures

To begin the study, a letter requesting the school's participation was mailed to the school district superintendent (Appendix D). The letter explained the nature of the study and the benefits the school district may gain from participating in the study. District administration was assured the findings will be kept confidential and no student or teacher identity will be exposed.

Following approval by the school board and superintendent, a letter was sent to the high school principal and assistant principal (Appendix E). The letter explained the nature of the study and informed the principals of the school board and superintendent approval for the study. The principal was assured that the findings will be kept confidential and no student or teacher will be identified.

Once approval was obtained by the school board, superintendent, and high school principal, high school foreign language teachers were informed of the study and were provided participation consent forms (Appendix F). The high school foreign language teachers chose the classes to participate in the study and a student assent letter (Appendix G), student letter (Appendix H) and student consent letter (Appendix I) were sent home to the respective students. The letter contained information to the parents and students about the nature of the study and the confidentiality of the study. The student assent form (Appendix J) and the student consent form (Appendix K) were sent home to the

appropriate students based on age. The parent permission form and student assent/consent forms needed to be signed in order for student data to be included in the study. The letter informed parents and students that the educational experience would not differ for the children if they did not participate in the study.

Students and teachers will be given the Research Assessment Package for Schools Student Self-Report for Middle School (RAPS-SM), as a pre-intervention survey prior to using the virtual world or face-to-face environment (Appendix K). This pre-intervention survey was identical to the post-intervention survey and used a six-point Likert scale to identify student engagement. The Student Self-Report for Middle School (RAPS-SM) is a multidimensional measure and the questionnaire included 84 items and 4 demographic questions. The survey items addressed either cognitive or emotional forms of student engagement. There were 70 questions that addressed the emotional aspects of student engagement in school as indicated in Table 1. There were 14 questions that addressed the cognitive forms of student engagement as indicated in Table 1. All items were responded on the following modified scale: Always True (6), Often True (5), Sometimes True (4), Sometimes Not True (3), Often Not True (2), and Never True (1) (IRRE, 1998).

The survey instrument was designed to be completed by students within one class period. Teacher administrators were trained together on the survey process prior to administrating the questionnaire. Many of the questions on the RAPS-SM asked students to address feelings of relatedness with and support from their teachers. To avoid coercion, when administrating both the pre-intervention survey and post-intervention survey to students, foreign language teachers exchanged rooms and administered the survey in classes other than their own. A copy of the survey was provided to each

student, and the question administrators read the standard instructions and the first three question items aloud to students. The scale (i.e. Always True, Often True, Sometimes True, Sometimes Not True, Often Not True, and Never True) was read aloud for the first three questions. If students were indecisive with particular questions, they were allowed to skip those questions.

Teachers in the target district vary in their level of experience using virtual worlds. All teachers in the target district had experience using and navigating in a virtual world environment, but their application of virtual worlds in the classroom varied. To control for the teacher effect on the results of student engagement in the two environments, each teacher taught at least one class in the virtual world and one class in the face-to-face environments. It is possible that the pedagogical expertise of each teacher could impact the students in the two environments, so the design of the experiment was to limit the impact by having each teacher teach in both environments.

Following the pre-intervention survey, teachers completed the Teacher-Report of Student Engagement for Middle School (RAPS-TM) report measure for each student participating in their class (Appendix L). The Teacher- Report of Student Engagement for Middle School is a brief, 4-item report measure of student engagement in school. Question two was negatively worded, as indicated by the *. The four items were:

1. In my class, this student seems tuned in. (teexs54)
2. This student comes to class unprepared. (tebxf2*)
3. This student does more than required. (tebxs1)
4. This student participated during class sessions. (modified)

Each of the four items was responded on the following scale: Always True (6), Often True (5), Sometimes True (4), Sometimes Not True (3), Often Not True (2), and Never True (1). The codes are in parentheses for each item and follow the suggested codes from the Institute for Research and Reform in Education (IRRE) administered surveys (IRRE, 1998). All teachers participating in the study were given the questionnaires at the same time and were given an hour to complete them.

Student survey responses (both pre- and post-intervention surveys) were first sorted based upon the participation status. Only the responses with parent permission/assent or student consent were selected for data analysis, and the rest were destroyed. The selected responses were then formatted in an alpha-numeric code that allowed the researcher to identify the group. The first part of the code was an alphabetic letter identifying the class; the second part of the code was the session number (e.g. 01 through 10); and the last part of the code was the participant identification number (e.g. 01, 12, 24). For example, the student ID "C0416" identifies the third course for the study, period four of the class, and the 16th participant in the study.

Following the pre-intervention survey, students were randomly assigned to receive instruction either in a virtual world or traditional face-to-face environment for the next unit in the foreign language. The lesson unit lasted a minimum of ten (10), 42-minute class sessions for both modes of instruction. The FtF lessons were taught in their typical foreign language classrooms. The virtual world environment lessons were taught in a computer lab using *OpenSim* for student access. Since there is no longer a *Teen Second Life* and *Second Life* is only open for adults 18 years of age and over, there is a need for a virtual world platform that is conducive to both under 18 and over 18

populations. *OpenSim* is a platform that looks similar to *Second Life*, but provides full rights to the users. The target school district owns virtual land through Reaction Grid on *OpenSim* and used this virtual space to conduct class sessions.

Following the instruction in either the virtual world or the face-to-face setting, students were provided the same pre- and post-intervention survey. The same procedures were followed for the post-intervention survey.

Data Analysis

The data analysis for research question one was a MANCOVA. The data analysis for research question two was an ANCOVA, controlling for cognitive and behavioral covariates. The data analysis for research question three was an ANCOVA, controlling for behavioral and emotional covariates. The data analysis for research question four was a *t*-test.

Conclusion

This study explored the relationship of student engagement in the virtual world and traditional face-to-face environment in a high school foreign language classroom. Student engagement is a multidimensional construct of emotional, cognitive, and behavioral components. Each of the components was analyzed, controlling for covariates. The implications of these relationships are presented in the following chapter.

CHAPTER IV

RESULTS

The primary goal of the study is to determine if there are significant differences in multidimensional student engagement between traditional face-to-face and virtual world learning environments. This chapter will discuss the findings related to the following research hypotheses:

H_0: When practicing conversational foreign language, there will be no reported differences in student engagement between in the virtual world and in the traditional face-to-face environments.

H_{01}: There will be no significant group differences of emotional student engagement between the virtual world and the face-to-face environments while learning a foreign language.

H_{02}: There will be no significant group differences of cognitive student engagement between the virtual world and the face-to-face environments while learning a foreign language.

H_{03}: There will be no significant group differences of behavioral student engagement between the virtual world and the face-to-face environments while learning a foreign language.

Prior to the analysis, the data was assessed for assumptions of normality and homogeneity of variance. Normality was assessed using scatterplots, and the assumption was met. Homogeneity of variance was assessed with Levene's test of equality of variance. Levene's test of equality of variance tests the null hypothesis that the error

variance of the dependent variable is equal across groups. The test was not significant and verified that the assumption of equality of variance is met.

Descriptive Statistics

One hundred thirty-six participants completed the necessary requirements to be included in the data analysis. Student participants were from one of three language classes offered by the school: German, French, and Spanish. There was a fairly even distribution of students in each of the three language classes. Classes were randomly assigned to either a virtual world or traditional face-to-face learning environment. Each language represented had at least one class in the virtual world and one class in the traditional face-to-face learning environment. The majority of students identified themselves as Caucasian, and most of the students expected an A or B grade in the class. Frequencies and percentages of demographic student data are presented in Table 1.

Based upon the power analysis, the program indicated for an actual power of .95, an effect size of .30 and an alpha level of .05, the study requires 111 student participants. There are 136 student participants in this study.

Table 2

Frequencies and Percentages: Student Demographics

Variable		*n*	%
Language	German	47	34.6
	French	36	26.5
	Spanish	53	38.9
Environment	Face-to-Face	59	43.4
	Virtual World	77	56.6
Gender	Female	72	52.9
	Male	64	47.1
Class Level	Grade 9	38	27.9
	Grade 10	47	34.6
	Grade 11	38	27.9
	Grade 12	13	9.6
Ethnicity	American Indian	2	1.5
	Biracial	1	.7
	White	132	97.1
	Other	1	.7
Grade Expect in Course	A	89	65.4
	B	39	28.7
	C	7	5.1
	D	1	.7
	F	0	0

All foreign language teachers from the school district participated in the study. This includes one German, one French, and three Spanish teachers. Because there were more Spanish teachers, there is a majority of Spanish classes included in the study. Each Spanish teacher had at least one class in the virtual world and one class in the traditional face-to-face learning environment. All of the teachers in the study had previous experience teaching in a virtual world environment and traditional face-to-face environment. Frequencies and percentages of demographic teacher data are presented in Table 3.

Table 3

Frequencies and Percentages: Teacher Demographics

	Variable	*n*	%
Teachers	German	1	20
	French	1	20
	Spanish	3	60
Classes	German	5	29.4
	French	2	11.8
	Spanish	10	58.8
Face-to-Face Classes	German	2	28.57
	French	1	14.29
	Spanish	4	57.14
Virtual World Classes	German	3	30
	French	1	10
	Spanish	6	60

Combined Student Engagement

A two-way MANOVA was conducted to determine the effect of traditional face-to-face and virtual world learning environments on multidimensional student engagement. Data were first transformed to eliminate outliers. MANOVA results indicated that there was no significant effect between environments on the combined dependent variable of engagement, $F(2, 131) = 1.608$, $p = .204$; Pillai's Trace = .024; partial $\eta^2 = .024$. Table 4 presents the MANOVA summary table for combined student engagement.

A detailed look on the mean scores of the pre-intervention survey and post-intervention survey (Appendix M), however, showed there was a slight increase in combined student engagement for the virtual world environment. The trend indicated that students were slightly more engaged in the virtual world environment that in the traditional face-to-face environment.

Table 4

MANOVA Summary Table

Effect	Value	F	Hypothesis *df*	Error *df*	Sig.	Eta Squared
Emotional	.655	124.254[a]	2.00	131.000	.000	.655
Cognitive	.471	58.393[a]	2.00	131.000	.000	.471
Environment	.024	1.608[a]	2.00	131.000	.204	.024

Note. [a] Exact statistic

Emotional Student Engagement

A 2 x 2 analysis of covariance was conducted to determine the effect of the face-to-face or virtual world learning environment on emotional student engagement when controlling for pre-survey scores. The mean score was used in the pre- and post- surveys to control for missing values. There was no significant effect of the between-subjects factor group $F(1, 132) = .297$, $p = .587$, partial $\eta^2 = .002$. Table 5 presents a summary of the ANCOVA results. No statistically significant difference was found in emotional student engagement between the traditional face-to-face and virtual world learning environments.

The pre-intervention survey histogram (Appendix N) indicated that the mean emotional student engagement score was 4.60. Following the intervention, the mean emotional student engagement score (Appendix O) was 4.59 in the post-intervention survey. The slight decrease in mean student emotional engagement scores indicated that students are less emotionally engaged in a virtual world learning environment than in the traditional face-to-face learning environment.

Table 5

ANCOVA Summary Table: Emotional Student Engagement

Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Corrected Model	27.461[a]	3	9.154	106.758	.000	.706
Environment	.100	1	.100	1.170	.281	.002
Pre_Survey_Emotional	26.768	1	26.768	312.192	.000	.701
Environment * Pre_Survey_Emotional	.117	1	.117	1.368	.244	.007
Error	11.318	132	.086			
Total	2903.541	136				

Note. [a] R Squared= .708 (Adjusted R Squared= .702)

Cognitive Student Engagement

A 2 x 2 analysis of covariance was conducted to determine the effect of the face-to-face or virtual world learning environment on cognitive student engagement when controlling for pre-survey scores. Initial data screening led to the transformation of scores to a mean to control for missing values. There was no significant effect of the between-subjects factor group $F(1, 131) = 2.806$, $p = .096$, partial $\eta^2 = .021$. Table 6 presents a summary of the ANCOVA results. No statistically significant difference was found in cognitive student engagement between the traditional face-to-face and virtual world learning environments.

The mean scores of student cognitive engagement (Appendix P), however, indicated a slight increase for the virtual world environment. The mean score of student cognitive engagement was 4.15 in the traditional face-to-face learning environment and the mean score of student cognitive engagement was 4.49 in the virtual world environment. The increase between the two learning environments indicated that students were more cognitively engaged in the virtual world learning environment over the traditional face-to-face learning environment.

Table 6

ANCOVA Summary Table: Cognitive Student Engagement

Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Corrected Model	51.585[a]	2	25.793	68.572	.000	.511
Environment	1.056	1	1.056	2.806	.096	.021
Pre_Survey_Cognitive	48.142	1	48.142	127.991	.000	.494
Environment * Pre_Survey_Cognitive	2.777	1	2.777	7.711	.006	.113
Error	49.274	131	.376			
Total	2672.919	134				

Note. [a] R Squared= .511 (Adjusted R Squared= .504)

Behavioral Student Engagement

There was no pre- or post- survey for student behavioral engagement; teachers answered four questions on each student's behavioral engagement in their class. Since there was not a pre- or post-survey for student behavioral engagement, a *t*-test analysis is conducted to test whether there is a difference in behavioral student engagement in the virtual world or traditional face-to-face learning environments.

Each teacher in the study taught at least one traditional face-to-face environment and one virtual world environment. They have an understanding of the difference between the two learning environments and were able to differentiate. Teachers reported on individual student behavioral engagement levels using four RAPS-TM questions. An independent *t*-test was conducted for the two groups, virtual world and face-to-face learning environments. An independent *t*-test showed that the difference between conditions was not significant ($t = -1.909$, $df = 134$, $p = .058$, two-tailed). Table 7 presents a summary of the *t*-test results. Students were more behaviorally engaged in the virtual world learning environment (mean = 4.70) than in the traditional face-to-face learning environment (mean = 4.39), but there was no significant difference between environments. The mean difference between conditions was .31, and the 95% confidence interval for the estimated population mean difference was between -.66 and .01. The effect size was medium (d = -.33).

Individual student behavioral engagement was identified by teachers completing a four-question survey on each student in the class. There was a higher mean behavioral engagement score of students in the virtual world learning environment over the traditional face-to-face learning environment. The higher mean score indicated that

students were more behaviorally engaged in the virtual world than the face-to-face environment.

Table 7

t-Test Summary Table: Behavioral Student Engagement

	Levene's Test for Equality of Variances		t-test for Equality of Means		
Average	F	Sig.	t	*df*	Sig. (2-tailed)
Equal variances assumed	2.127	.147	-1.909	134	.058
Equal variances not assumed			-1.866	112.717	.065

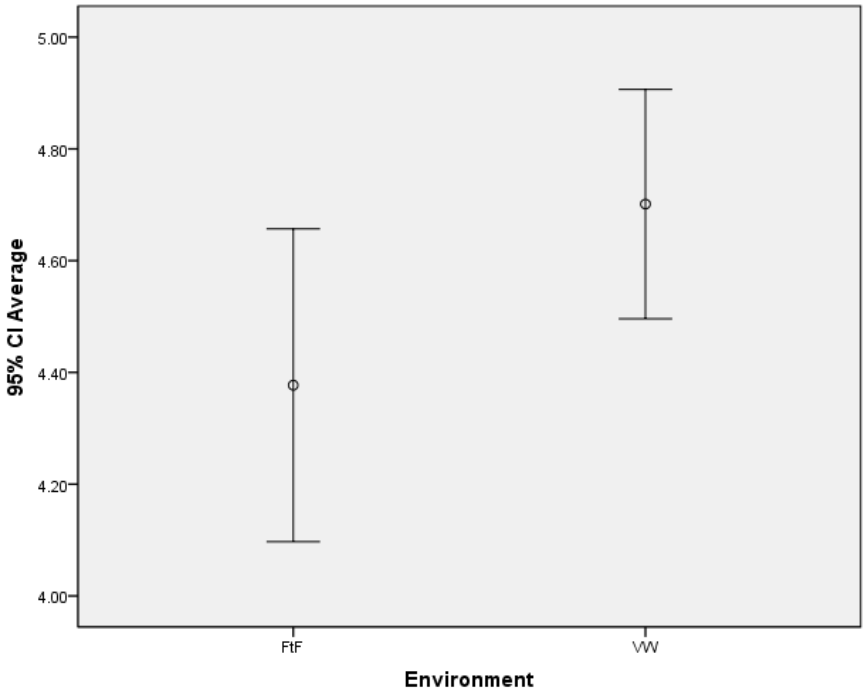

Figure 1. t-Test Chart: Behavioral Student Engagement

Chapter Summary

Combined student engagement was not significant between learning in the virtual world and traditional face-to-face learning environments. Student emotional engagement was not significant when comparing between the two learning environments. Student cognitive engagement was not significant in either the virtual world or traditional face-to-face environment. Student behavioral engagement was not significant between the two environments. Conclusions from the analyses of the data will be described in Chapter Five.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Summary of Purpose

The purpose of the study was to evaluate student engagement in high school foreign language classrooms and determine if virtual worlds impact student engagement. Student engagement was defined as a multidimensional construct that includes emotional, cognitive, and behavioral criteria. The study examined the differences in student engagement between the virtual world and traditional face-to-face learning environments. One of the primary purposes of the study was to look at overall student engagement between learning in a virtual world setting versus a traditional face-to-face setting when learning a foreign language. Another purpose of the study was to determine if there are individual group differences in the multidimensional constructs of student engagement.

Summary of Procedures

A total of five foreign language teachers (17 courses overall) participated in the study, representing German, French, and Spanish languages. Teachers chose the classes to participate based on computer lab availability and students' foreign language levels. Students completed the RAPS-SM pre-intervention survey prior to any intervention or new instruction. The survey is a multidimensional measure that includes 84 items and 4 demographic questions. Following the pre-intervention survey, classes were assigned to either the traditional face-to-face or virtual world learning environments. Each teacher in the study taught at least one traditional face-to-face class and one virtual world class. Students were taught their new foreign language material in the specific learning environment. For example, students in the French group were studying French

Impressionism. In the traditional face-to-face environment the students were exposed to various impressionist paintings through the textbook and handouts. The students then discussed the qualities that defined each painting. In the virtual world environment, the students explored the same impressionist paintings in a virtual three-dimensional space. The paintings spanned a large area of the virtual space and students had the flexibility to choose which paintings they would examine.

Following ten days of instruction, students completed a post-intervention survey that was identical to the pre-intervention survey. Teachers completed a RAPS-TM four-question survey on student behavioral engagement for each student participant in the study. Data for pre- and post-intervention surveys were converted to a numerical format for analysis.

Participants Demographics

The study was conducted in a public high school in southwestern Pennsylvania. The school district is rural within 203 square miles and approximately 1,900 enrolled students. The study was conducted with students in grades 9-12 currently taking a foreign language class offered during the traditional school day. The student groups were similar in grade configurations and levels of experience in the target language. One hundred thirty-six participants completed the necessary requirements to be included in the study. There were 47 participants from the German classes, 36 participants from the French classes, and 53 participants from the Spanish classes. There was a fairly even distribution of face-to-face and virtual world learning environment, as well as male to female ratios. Students ranged in class level, with most students being in grades nine through 11. Most students identified themselves as Caucasian, with others identifying

themselves as American Indian, Biracial, or other. Most students expected an "A" grade in their foreign language course.

Summary of the Findings

The major research question in the study was to identify if there are differences in reported student engagement between the virtual world and the traditional face-to-face environments. Analysis was conducted by combining student engagement results from the pre- and post- intervention surveys in the face-to-face and virtual world learning environments. The results indicated there was no significant overall student engagement difference between the face-to face and the virtual world learning environment.

Student engagement most likely refers to the cognitive, emotional, and behavioral aspects of student investment to education (Caraway, Tucker, Reinke, & Hall, 2003; Munns & Woodward, 2006; Skinner, Wellborn, & Connell, 1990; Tucker et al., 2002). Students are engaged in school work when they are reflectively involved in understanding, valuing the work they are completing, and participating actively in school and classroom activities (Munns & Woodward, 2006). Improvements in overall learning outcomes are best achieved when students are engaged behaviorally, emotionally, and cognitively (Appleton et al., 2008; Banger-Downs & Pyke, 2002; Masters & Gregory, 2010; Yazzie-Mintz, 2007) with all three categories being as equally as important (Harris, 2008). Student engagement is a more significant factor of student academic success than the amount of instructional time (Boykin & Noguera, 2011) and can be a reliable predictor of student outcomes in academic subjects (Leithwood & Jantzi, 1999).

The first component of student engagement examined in the current study is emotional engagement. This study analyzed if there were significant group differences in

student emotional engagement in the virtual world and traditional face-to-face learning environments. The pre- and post-intervention surveys indicated there was no significant difference in emotional student engagement between the two learning environments. This indicates that students were emotionally engaged equally regardless of learning environment. The emotional connections with their peers were equivalent when completing tasks through the virtual world environment.

The second component of student engagement is cognitive engagement, which includes student cognitive strategy use, student mastery, and student attention (Caraway et al., 2003). This study analyzed if there were significant group differences in student cognitive engagement in the virtual world and face-to-face learning environments. No significant differences were uncovered between the face-to-face and virtual world learning environments, indicating that students were cognitively engaged equally regardless of learning environment. While not statistically significant, the slightly higher mean cognitive engagement score of the virtual world environment was witnessed. The increase in cognitive engagement shows the tendency of the virtual world environment being slightly more cognitively challenging for students. Focused attention is based on immersion in the learning environment, and virtual worlds provide this context because they are highly detailed, three-dimensional, and interactive (Barnes & Pressey, 2012). Whether the slightly increased cognitive engagement in the virtual world environment was due to intrinsic motivation or active learning opportunities may warrant future studies (Johnston, Massey, & DeVaneaux, 2012).

The last area studied in the face-to-face and virtual world learning environments was student behavioral engagement. Teachers reported student behavioral engagement,

and the data analysis indicates there was no significant difference between the face-to-face and virtual world learning environments, indicating that students were behaviorally engaged equally regardless of learning environment. While no statistical significance was found, slightly higher mean scores of teacher surveys on students' behavioral engagement in the virtual world environment show a potential of a virtual world learning environment to assist students to become more behaviorally engaged in school. Students that are less behaviorally engaged in school tend to have truancy, discipline, and academic preparedness problems. Whether less behaviorally engaged students can benefit from the use of virtual world learning environments warrants additional study.

Findings Related to Literature

With recent virtual technology advancement, virtual worlds are providing educational possibilities that have not been available before the 2000's (Damer, 2008). Some of the acknowledged advantages of virtual worlds included increased flexibility, dialogue opportunities, and multiple communication possibilities (Jensen, 2009). One of the criticisms of virtual worlds, on the other hand, is the speculation on difficulty of achieving student engagement in similar degrees to the traditional face-to-face environment. Empirical studies on student engagement on virtual world environments, while limited, report mixed findings. For example, while some studies, indeed, show diminished student engagement in virtual world learning environments (Fetscherin & Latterman, 2008; Roussos et al., 1999; Utz, 2000), some other recent studies indicate participants in virtual world learning environments experience significantly higher levels of engagement over the traditional learning environment (Barnes & Pressey, 2012;

Franceschi, Lee, Zanakis, & Hinds, 2009). The lacking consensus on student engagement in virtual world environments was the impetus of the current study.

Student Engagement

Effective learning is contingent upon the extent that students are engaged in the classroom (Reyes, Brackett, et. al., 2012), and student engagement affects academic achievement (Klem & Connell, 2004). Student engagement is a predictor of learning, cognitive development, academic success, and retention (Leithwood & Jantzi, 1999; Terrion & Aceti, 2012). Disengaged students become disruptive, are less likely to aspire to higher-education, experience lower grades, and are more likely to drop out (Reyes, Brackett, et. al., 2012). Engagement in high school is connected with attendance to higher education institutions (Grier-Reed, Appleton, Rodriguez, Ganuza & Reschly, 2012). These findings demonstrate the importance of student engagement in schools and its long-term consequences; if students are not engaged in their schools, they are more likely to cause disruptions, not attend higher-education institutions, and are more likely to drop out of school. Since student engagement is a significant determining factor on student success, schools need to have the pedagogy and the classroom experiences for students to stay engaged.

Often times, teachers are asked or expected to support students with better educational technology methods to enhance learning (Berns, Gonzalez-Pardo, & Camacho, 2012). Technology can play a role to engage student to a class because students often react positively to technology integration in the classroom (Terrion & Aceti, 2012). The current study demonstrated that overall student engagement is not different between the virtual world and the traditional face-to-face learning environment.

In fact, the study not only showed that the combined student engagement indicators were similar in the two learning environments but also displayed an overall positive trend in student engagement in the virtual world learning environment. In this perspective, the findings of this support past research asserting technology is an effective means engaging students (Badge, Saunders, & Cann, 2012; Garcia-Santillán, Chávez, Boggero-Correa, & Vela-Aguilar, 2012; Thompson & Hughes, 2012; Vogel & Robideau, 2012; Walton, 2012).

Merely using technology, however, does not necessarily support or increase student engagement. As can be seen in Chih-Yuan Sun and Rueda's study (2012), while certain online technologies, such as multimedia videos and discussion boards, contribute to increase emotional engagement, they do not help increase behavioral or cognitive engagement for students. When schools need to integrate technology to increase student engagement, they thus need to use the proper tools for the chosen goal. If student emotional engagement is the focus in a school, then school administrators and teachers must identify which tool will best achieve the desired outcome of increased student emotional engagement. Future studies in student engagement will need to identify the different educational technologies and their impact on the multidimensional measures of student engagement. School administrators and teachers will also need to continuously participate in professional development opportunities to learn effective ways to integrate technology.

In addition to carefully selecting technology, teachers need to provide students with opportunities to be actively engaged through authentic learning experiences, communicate with the teacher and peers, learn cooperatively and receive prompt

feedback (Berns, Gonzalez-Pardo, & Camacho, 2012; Terrion & Aceti, 2012), since students are more engaged and learn better through completing a task instead of passively listening (Terrion & Aceti, 2012). In the current study, both environments included opportunities for students to complete tasks and to communicate in a different language with their peers. Effective pedagogical practice when using technology is critical for the success of technology integration in classroom. Technology alone will not increase student engagement, but the effective use of technology will. Future student engagement research may need to identify ways of effective pedagogical practices of technology and their opportunities for student engagement.

Cognitive Engagement

As mentioned with the previous studies indicating the relationship between overall student engagement and academic success in school, student cognitive engagement relates to their academic competence (Ross & Willson, 2012). If student cognitive engagement is high, then student academic performance will also likely be high because students are willing to put forth the cognitive effort necessary to be academically successful in their coursework (Alvarez & Frey, 2012; Veiga, 2012). In Schwienhorst (2002), student cognitive engagement between two environments, virtual reality and face-to-face, was compared in computer-assisted language learning and the results indicated that student cognitive engagement was higher in the virtual reality group compared to the face-to-face. With the finding that student cognitive engagement was similar regardless of their learning environments, the current study is in line with Schwienhorst's (2002).

Regarding the assertion that student cognitive engagement relates to their academic achievement, Chih-Yuan Sun and Rueda (2012) argue that online activities

promoting and focusing on interaction, like similar face-to-face activities, can facilitate social cognitive effects and improve engagement. The current study results support this focus of interaction in online activities for improved engagement. In the study setting, classes in both environments focused on social interaction, and the results demonstrated almost identical positive cognitive engagement in both environments. Future studies in student cognitive engagement may identify the types of social interactions that can optimize student cognitive engagement in a targeted learning environment or in all learning environments. Schools may utilize this information to develop an educational setting that are cognitively challenging.

Emotional Engagement

Emotional connections students experience in their classrooms impact success in school (Reyes, Brackett, et. al., 2012). Emotional engagement in school includes student to student and student to teacher engagement. Student to student engagement includes opportunities to interact and collaborate with peers (Chih-Yuan Sun & Rueda, 2012); by learning from one another through student to student communication, emotional engagement can help internalize concepts learned in the classroom (Ross & Willson, 2012); a lack of these opportunities results in a decline in student emotional engagement. Students who have a close relationship with their teacher are more engaged, work harder in the classroom, are persistent in difficult times, and accept teacher criticism for growth (Hughes & Kwok, 2007).

Students need opportunities to interact with peers and the teacher in both learning environments (Chih-Yuan Sun & Rueda, 2012). In the current study, students had an opportunity to interact with peers as well as with teacher in both learning environments.

In the face-to-face environment, students interacted verbally to one another in the physical classroom. In the virtual world environment, students used the microphone and chat feature to communicate. No student emotional engagement difference was found between the two environments in the current study support the assertion that CMC interactions can promote friendly environments that assist students with overcoming social barriers found in the face-to-face environment (Long, 2012).

Socialization is the by-product of the educational environment, and the Internet has become a major means for communication whether it is personal or school-related (Watson & Gemin, 2008). It is often found that today's students enjoy socializing in online environment during their personal time (Watson & Gemin, 2008). It may be worthwhile for schools to think of the possibilities expanding student socialization to the online learning environment. Student socialization can lead to development of learning communities and assist to maintain student motivation (Minocha & Roberts, 2008). Future studies may then include the changes in student emotional engagement with the expanded online socialization opportunities.

Students who report having better quality relationships with teachers are three times more engaged, perform better academically, and do better on standardized achievement tests (Reyes, Brackett, Rivers, White, & Salovey, 2012). Teachers can create an environment in both the virtual world and face-to-face that fosters student comfort, respect, and communication, which lead to increased emotional engagement (Reyes et al., 2012). This study affirms Reyes et al. (2012) in both learning environments because there was not a difference in student reported emotional

engagement. The study affirms teachers can create an emotionally engaging learning environment and in both learning environments.

Behavioral Engagement

Behavioral student engagement is more than just attendance in a class. Students who are attentive, participate in discussions, exert effort, exhibit interest and motivation (Mandernach, 2010; Reyes et al., 2012) are considered behaviorally engaged. Behavioral engagement also includes student attendance, participation in class, participation in extra-curricular activities and completion of course assignments (Grier-Reed et al., 2012; Veiga, 2012). Behavioral engagement variables measured in middle schools and high schools have positive academic outcomes and can predict dropout and completion rates (Alvarez & Frey, 2012; Grier-Reed et al., 2012). Behavioral engagement can also have an impact on student self-efficacy (Johnston, Massey, & DeVaneaux, 2012). In a study where behavioral engagement was measured by baseline and post-survey questionnaires, participants in a three-dimensional virtual world were either as equally engaging behaviorally, if not better, as participants in the face-to-face environment; and virtual world participants exhibited equal, if not more, self-efficacy than the face-to-face participants (Johnston, Massey, & DeVaneaux, 2012). The current study also found that the participants in the virtual world environment show no difference in the level of behavioral engagement compared with participants in the face-to-face environment.

As was introduced earlier in this section, participation in activities and attendance are only two measurable components of behavioral engagement. Additional research identifying innovative ways to measure behavioral engagement of students in both learning environments are needed. Since students who are less behaviorally engaged in

school tend to have truancy and discipline problems (Grier-Reed et al., 2012), and since empirical evidence of equal potential for student behavioral engagement in both face-to-face and virtual learning environments, schools may extend their effort to improve student behavioral engagement and student retention in school by providing additional online opportunities for students.

Limitations and Delimitations of the Study

While the current study provided significant implications to the literature, there are limitations and delimitations that need to be discussed for future studies to overcome. In this section, suggestions are provided on how future studies can overcome these limitations.

One limitation was computer lab availability for the virtual world classes. Previous literature has indicated that virtual world environments require sophisticated computers that schools may have limited access for students (Baker et al., 2009; Kemp & Livingstone, 2006; Wagner, 2009). In a study with college students, most participants reported Internet was not sufficient in university dormitories to provide an acceptable virtual world experience and only half of the students had computers sufficient to the program's requirements (Knutzen & Kennedy, 2012). In the current study, participants could only use one computer lab, which was for students in grades 6-12. This reduced the lab availability for the students in the study. While it was not a limitation of the current study, meeting computer requirements can also be a barrier to using virtual worlds in K-12 schools (Baker et al., 2009; Kemp & Livingstone, 2006; Wagner, 2009). Computer classrooms do not necessarily have the latest graphic cards and cannot draw the graphics of virtual world requirements (Holmberg, 2012). Future studies should

consider their computing capabilities prior to utilizing virtual worlds and ensure the necessary computing requirements are met to provide necessary student access.

When utilizing technology in the classroom, students need to have a procedural understanding of the technology use prior to effectively using it in the learning environment (Whitton, 2012). The steep learning curve in the beginning of utilizing a virtual world environment is significant (Baker et al., 2009; Clarke, 2012; Wang & Shao, 2012; Whitton, 2012). While the participants of the current study had an opportunity to learn the basic navigation of the virtual world environment during their first class in the lesson, the participants still had limited knowledge and skill to navigate their avatar and utilize the program. A second limitation is the learning curve to manipulate an avatar in the virtual world environment is significant (see Baker et al., 2009; Clarke, 2012; Wang & Shao, 2012; Whitton, 2012) and this challenge might have caused anxiety and created experiences where the users reject the learning process (see Davis et al., 2008). While statistically not significant, the interface, avatars, and increased cognitive loads with the initial learning curve, innate in a virtual world, might have caused the slightly lower student engagement in the virtual world than the face-to-face. In the current study, navigating the avatar, communicating in the environment, and learning the tool was new to some students; the lack of regulating the steep initial learning curve in a virtual world, thus, is a limitation in this study. By considering the initial learning curve, future research should allow enough time for students to navigate the avatar, communicate in the environment, and learn the interface prior to conducting engagement research. Future studies can identify the time required for students to learn navigating in the virtual world

and ways to orient students in the environment. Schools should consider this factor when adopting virtual world in classrooms to adequately improve student engagement.

A third limitation is the use of survey data and the accuracy of self-surveys (see McCormick & McClenney, 2011). Research is less definitive in student engagement beyond self-surveys and engagement variations exist based on the subjects' perceptions of his or her answers to the questions (see Veiga, 2012). Variations also exist between teacher surveys. All teachers completed the RAPS-TM for each student in their class to identify behavioral engagement in either the virtual world or the face-to-face environment. Teachers might have had different expectations of their students and might have reported engagement levels differently. Future studies will experience a similar limitation if they use self-surveys, but research can reduce this limitation by finding engagement assessments that report multidimensional student engagement through means other than self-surveys. As mentioned previously, additional research identifying innovative ways to measure engagement of students in both learning environments are needed.

Integrating technology in the classroom can create novel learning experiences. Novelty sometimes enhances student engagement in the classroom setting (Chih-Yuan Sun & Rueda, 2012). Novelty is, however, not an area where school administrators, teachers, or researchers want to validate increasing student engagement, but it is worth mentioning in connection with this study. While novelty may have a positive impact on student engagement, the novelty effect will not last long with students. In this perspective, a fourth limitation in this study is that not all students had prior experience in a virtual world environment prior to the study. Experience with the new environment

might have contributed to the increase in overall engagement of students in the virtual world compared to the traditional face-to-face environment. Researchers and schools will need to consider the novelty effect when integrating new technology and analyzing its impact on student engagement. Future studies in student engagement can identify the length of time the novelty effect can impact student engagement and if educational technologies still have a positive impact on student engagement after the novelty effect has occurred.

The teacher effect was another limitation in this study. The teacher effect was not studied as part of this research and it is possible that the pedagogical expertise of the teachers, along with other teacher effect factors, can impact the students in the virtual world and face-to-face environments. In this study, the teachers were familiar with teaching in a virtual world environment and the technical expertise of the teachers could impact the results of the study. Future studies should consider these factors when designing their research.

This study was delimited to students in grades 9-12 currently enrolled in a foreign language class. This study was delimited to students in these specific grades because this age group has the technological knowledge to learn and utilize the computer in a virtual world environment. Younger age groups also begin studying foreign languages in the middle school of the target district; with reasoning that their computer experience would increase the steep initial learning curve and novelty effect limitations, the middle school population was not included in this study. Basic knowledge of navigating an avatar, using a chat feature, and moving in three dimensional space were prerequisite skills for students to learn the interface quickly and middle school students might not have all have

the prerequisite skills required. Future research should consider student and computer capabilities in conjunction with the time allotment and researchers should delimit appropriate student grades that can utilize the virtual world application.

Student language skill levels could have an impact on reported student engagement. In this study, students in the foreign language classes were at varying levels, from level 1 through level 5 language classes. The language levels were not analyzed as part of this study. Future studies may find it worthwhile to analyze the students' language level and the effect, if any, of engagement with the virtual world or face-to-face environment.

Future Research

Research literature on virtual worlds is still limited, but an emerging understanding of the technology is influencing the research on teaching and learning in virtual worlds (Jensen, 2009), and the virtual worlds' potential educational applications (Hew & Cheung, 2010). Unfortunately, however, many of the virtual world studies are now outdated and only a limited number of studies are in K-12 (e.g., of 65 published papers between the years 2005 through 2011, only 29% were in K-12) (Kim, Lee, & Thomas, 2012). Of these 65 publications, only only 23% focused on communication in a virtual world) (Kim, Lee, & Thomas, 2012).

With the acknowledgement of the current study's limitations and delimitations, future research plans are made in both near future and long-term future. The initial focus of additional research will be on reducing the novelty effect and steep initial learning curve issue by lengthening the study duration to a school year. In the initial research extension, students will be exposed to the virtual world technology and become familiar

with the interface during the first semester. This will assist when the baseline assessment is completed in the second semester of the school year because there will reduced novelty effect and a steep initial learning curve.

A second area for short-term future research would be to complete the research in different schools in dissimilar environment. The current study was completed in a rural school district in southwestern Pennsylvania and the results from this population may differ from results in urban or suburban school districts. Rural households are significantly less likely to have a home computer or Internet access compared to urban respondents (Wilson, Wallin, & Reiser, 2003). In Melnick, Witmer, and Strickland's study (2008), student engagement between rural and urban settings relied on student access to engaging materials, specifically with the arts in their study. Students in rural areas tend to have less access to materials and are less likely to be engaged (Melnick, Witmer, & Strickland, 2008). Concerning technology access, student in rural schools may have less access to technology and may exhibit different results in engagement when utilizing virtual worlds.

The majority of past engagement studies with technology have primarily focused on post-secondary education. Student engagement has been commonly referenced but under researched (Harris, 2008) with most research focusing on one component of student engagement (Appleton et al., 2006). Acknowledging these issues, one of the future long-term studies can be on examining the optimal time frame for increasing student engagement with the use of technology in the classroom. Engagement in school begins to decline in young adolescence and by high school, over half of students reported not taking their studies seriously (Klem & Connell, 2004; Pianta, Hamre, & Allen, 2012;

Yazzie-Mintz ,2007). Findings from studies in middle schools demonstrate that competitive, standards-driven teaching contributes directly to a sense of alienation and disengagement of the student (Pianta, Hamre, & Allen, 2012). Young adolescents turn to managing their body image and their social standing with peers, with academic concerns becoming secondary (Roeser et al., 2002). If classrooms are able to provide the necessary support and education in the proper use of technology, such as the virtual world interface in a critical period of young adolescence, the issue of student engagement is limited.

Student engagement is a reliable predictor of student outcomes in social studies, math, and language achievement (Leithwood & Jantzi, 1999). Language achievement includes the native language, a foreign language, as well as a foreign language. Future long term research can expand to other disciplines, such as foreign language engagement, where social interaction is critical. Students in a foreign language learning environment have the benefit of an immersion opportunity (Baker & MacIntyre, 2000), and immersion opportunities can be possible in both the virtual world and traditional face-to-face learning environments. To master the target language, students must be engaged through social interaction and use more contacts in the target language (Baker & MacIntyre, 2000). Research in foreign language learning over the past two decades has focused on quasi-experimental and experimental studies addressing the effectiveness of instructional treatments in foreign language classrooms (Norris & Ortega, 2000) and future studies would benefit comparing virtual worlds and traditional face-to-face learning environments where social interaction is critical to student achievement and engagement.

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APPENDIX A

IRB APPROVAL DOCUMENT

DUQUESNE UNIVERSITY

Office of Research

301 ADMINISTRATION BUILDING ♦ PITTSBURGH, PA 15282-0202

Dr. Joseph C. Kush
Chair, IRB-Human Subjects
Office of Research
Phone (412) 396-6326 Fax (412) 396-5176
E-mail: kush@duq.edu

April 26, 2012

Re: Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms – (PROTOCOL # 12-60)

Dr. Misook Heo
School of Education
Duquesne University
Pittsburgh PA 15282

Dear Dr. Heo,

Thank you for submitting the research proposal of you and your students Ms. Laura Jacob, to the Institutional Review Board at Duquesne University.

Based on the review of IRB representative Dr. David Delmonico, and my own review, your study is approved as **Exempt** based on 45-CFR-46.101.b.1 regarding research conducted in established or commonly accepted educational settings, involving normal educational practices.

The consent form is attached, stamped with IRB approval and expiration date. You should use the stamped form as the original for copies you display or distribute.

The approval pertains to the submitted protocol. If you or you Ms. Jacob wish to make changes to the research, you must first submit an amendment and receive approval from this office. In addition, if any unanticipated problems arise in reference to human subjects, you should notify the IRB chair before proceeding. In all correspondence, please refer to the protocol number shown after the title above.

This approval will be renewed in one year as part of the IRB's continuing review. You will need to submit a progress report to the IRB at the address shown above. The report will involve supplying answers to a number of questions that will be sent to you. In addition, if you are still using assent/permission forms, you will need to obtain renewed approvals.

When the study is complete, please provide the IRB with a summary, approximately one page. Often the completed study's Abstract suffices. Keep a copy of your research records, other than those you have agreed to destroy for confidentiality, over a period of five years after the study's completion.

Thank you for contributing to Duquesne's research endeavors.

Sincerely yours,

Joseph C. Kush, Ph.D.

C: Dr. David Delmonico
IRB Records

APPENDIX B

LETTER TO PARENTS AND GUARDIANS

Dear Parents and Guardians:

This letter is a request for your assent for your child to be part of a research study, examining the differences of student engagement in traditional face-to-face and online virtual foreign language classes.

The study will be conducted during your child's regularly scheduled foreign language course and will consist of the same curriculum. Your child's foreign language course can be assigned to a face-to-face or online virtual world for about 10 class lessons. Your permission for your child's participation is voluntary and you are free to withdraw your permission at any time. If you provide your permission and if your child assents to participate, your child will be asked to answer pre- and post-intervention surveys. However, even if you provide your permission, if your child does not assent to participate, she/he will not be asked to respond to the surveys. If you wish to withdraw your permission or if your child wishes to withdraw her/his assent, your child's survey responses will not be used for the research. No collected data will be used if he/she withdraws. There will be no impact on your child's academic standing, whether she/he participates or not in the research study. Any identifying information will be kept confidential. A summary of the results of this research will be supplied to you, upon your request.

You have the right to inspect, upon written request to the Superintendent, the survey prior to distribution to students. The Parent Permission Form attached with this letter will need to be signed if you allow your child to participate in the study. Please feel free to contact me at 412-925-8485 should you have any questions.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX C

PERMISSION FORM TO PARTICIPATE

Duquesne University
Institutional Review Board
Protocol #: 12-60
Approval Date: April 26, 2012
Expiration Date: April 26, 2013

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

PARENT/ GUARDIAN PERMISSION TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms

INVESTIGATORS:

Misook Heo, Ph.D.
Associate Professor
Department of Instruction and Leadership in Education
412-396-1662
heom@duq.edu

Laura Jacob [Student Investigator]
PO Box 416
Claysville, PA 15323
412-925-8485
schwiri561@duq.edu

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in education at Duquesne University.

PURPOSE: You are being asked to provide your permission for your child to participate in a research project that seeks to investigate student engagement in high school foreign language classes with the traditional face-to-face and online virtual world learning environments.

If you give your permission for your child to participate in this study, she or he will be asked to complete pre- and post-intervention surveys about their engagement in school before and after participating in regularly scheduled foreign language classes.

These are the only requests that will be made of you and your child.

RISKS AND BENEFITS: There are no foreseeable risks to your child greater than those encountered in everyday life. Your child's participation may contribute to the knowledge of student engagement in high schools.

COMPENSATION: There will be no compensation for your child's participation in this study. Participation in the project will require no monetary cost to your child.

Duquesne University
Institutional Review Board
Protocol #: 12-60
Approval Date: April 26, 2012
Expiration Date: April 26, 2013

CONFIDENTIALITY: Any identifying information (e.g., demographic information) will be kept confidential and identity will not be exposed in the data analysis. All survey responses will be associated with participation ID.

Data collected for this research will be housed in a locked filing cabinet in the student researcher's home, and kept for a minimum of five years.

RIGHT TO WITHDRAW: You are under no obligation to provide permission for your child to participate in this study. You are free to withdraw your permission for your child to participate at any time. If you choose to withdraw your permission, your child's data already collected will not be used for the research.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me and my child. I understand that my permission is voluntary and that I am free to withdraw my permission at any time, for any reason. On these terms, I certify that I provide my permission for my child to participate in this study.

I understand that should I have any further questions about my child's participation in this study, I may call Ms. Laura Jacob, Student Investigator, 412-925-8485; Dr. Misook Heo, Advisor, 412-396-1662; or Dr. Joe Kush, Chair of the Duquesne University Institutional Review Board, 412-396-6326.

_____ _____

Parent/ Guardian Signature Date

_____ _____

Researcher's Signature Date

Revised: October, 2009

APPENDIX D

SUPERINTENDENT LETTER

Laura Jacob
PO Box 416
Claysville, PA 15323

Mrs. Beverly Arbore, Superintendent
McGuffey School District
90 McGuffey Drive
Claysville, PA 15323

Dear Mrs. Arbore:

This letter is a request for your permission and administrative recommendation for a motion to the Board of School Directors to conduct a high school student engagement study at your school district. The study is being performed as partial fulfillment of the doctoral degree in educational technology at Duquesne University. The research project seeks to investigate student engagement in high school foreign language classrooms in traditional face-to-face and online virtual world environments.

The study will consist of the same curriculum and be conducted during the regularly scheduled foreign language classes. The classes will be randomly assigned to two different modes of instruction – face-to-face or online virtual world. The students who participate in the study will be asked to answer the pre- and post-intervention surveys. Student participation is voluntary and they are free to withdraw at any time. If students wish to withdrawal their voluntary participation at any point of the research, their survey responses will not be used for the research. There will be no impact on academic standing, whether students participate or not in the research study. Any identifying information will be kept confidential. A summary of the results of this research will be supplied to you, if you wish.

I am seeking your permission and administrative recommendation for a motion to the Board of School Directors at the next school board meeting for this study. Attached with this letter are the letter to parents, parent permission form, student assent form, student consent form, and teacher consent forms. Should you need additional information or clarification, please feel free to contact me at 412-925-8485.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX E

PRINCIPAL LETTER

Laura Jacob
PO Box 416
Claysville, PA 15323

Principal
McGuffey High School
89 McGuffey Drive
Claysville, PA 15323

Dear Mr. Kucherawy:

This letter is a request for your permission to conduct a student engagement study at your high school. The study is being performed as partial fulfillment of the doctoral degree in educational technology at Duquesne University. The research project seeks to investigate student engagement in high school foreign language classrooms in traditional face-to-face and online virtual world environments.

The study will consist of the same curriculum and be conducted during the regularly scheduled foreign language classes. The classes will be randomly assigned to two different modes of instruction – face-to-face or online virtual world. The students who participate in the study will be asked to answer the pre- and post-intervention surveys. Student participation is voluntary and they are free to withdraw at any time. If students wish to withdrawal their voluntary participation at any point of the research, their survey responses will not be used for the research. There will be no impact on academic standing, whether students participate or not in the research study. Any identifying information will be kept confidential. A summary of the results of this research will be supplied to you, if you wish.

Please feel free to contact me at 412-925-8485 should you have any questions.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX F

TEACHER CONSENT FORM

Duquesne University
Institutional Review Board
Protocol #: 12-60
Approval Date: April 26, 2012
Expiration Date: April 26, 2013

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

TEACHER CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms

INVESTIGATORS:

Misook Heo, Ph.D.
Associate Professor
Department of Instruction and Leadership in Education
412-396-1662
heom@duq.edu

Laura Jacob [Student Investigator]
PO Box 416
Claysville, PA 15323
412-925-8485
schwiri561@duq.edu

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in education at Duquesne University.

PURPOSE: You are being asked to participate in a research project that seeks to investigate student engagement in high school foreign language classes with the traditional face-to-face and online virtual world learning environments. You will be asked to administer pre-survey and post-intervention surveys before and after teaching in regularly scheduled foreign language classes. Your administration of the surveys will be for classes other than your own. You will also be asked to participate in a survey once students complete both pre- and post-intervention surveys.

These are the only requests that will be made of you.

RISKS AND BENEFITS: There are no foreseeable risks greater than those encountered in everyday life. Your participation may contribute to the knowledge of student engagement in high schools.

COMPENSATION: There will be no compensation for participation in this study. Participation in the project will require no monetary cost to you.

CONFIDENTIALITY: Your identifying information will not be collected, thus your identity will not be exposed in the data analysis. All survey responses will be recorded in association with the student ID. Data collected for this research will be housed in a locked filing cabinet in the student researcher's home, and kept for a minimum of five years.

RIGHT TO WITHDRAW: You are under no obligation to participate in this study and your professional standing will not be affected whether you do or do not choose to participate. You are free to withdraw your consent to participate at any time. If you choose to withdraw from the study, your and your students' data that are already collected will not be used for the research.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I understand that my participation is voluntary and that I am free to withdraw consent at any time, for any reason. On these terms, I certify that I provide my consent to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may call Ms. Laura Jacob, Student Investigator, 412-925-8485; Dr. Misook Heo, Advisor, 412-396-1662; or Dr. Joe Kush, Chair of the Duquesne University Institutional Review Board, 412-396-6326.

_____ _____

Teacher Signature Date

_____ _____

Researcher's Signature Date

Revised: October, 2009

APPENDIX G

STUDENT ASSENT LETTER

Introduction to the Study

The study will examine the class level differences among foreign language courses. This study is not going to evaluate your academic standing in the classroom.

Your parents have already agreed for your participation; although your parents have provided permission, you have the right to make the decision on your participation. Whether you choose to participate in the study or not, you will have the same class experiences and your grade will not be affected based on your decision to participate in the study. Your participation is voluntary and you are free to withdraw at any time. No collected data will be used if you withdraw. Even if you do not want to participate in the study, you can still respond to the survey questions if you wish; however, your responses will not be used for the research. Your teachers and your classmates will not know that you are not participating in the study.

The Student Assent Form attached with this letter will need to be signed if you would like to participate in the study. Please feel free to contact me at 412-925-8485 should you have any questions.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX H

STUDENT LETTER

Introduction to the Study

The study will examine the class level differences among foreign language courses. Since your parents have not agreed to your participation, you will not be able to participate in the study. However, you will have the same class experiences and the same curriculum as your peers. Your grade will not be affected by not participating in the study. You can still respond to the survey questions if you wish; however, your responses will not be used for the research. Your teachers and your classmates will not know that you are not participating in the study.

If you have any questions, please feel free to contact me at 412-925-8485.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX I

STUDENT CONSENT LETTER

Introduction to the Study

The study will examine the class level differences among foreign language courses. This study is not going to evaluate your academic standing in the classroom.

You have the right to make the decision on your participation. Whether you choose to participate in the study or not, you will have the same class experiences and your grade will not be affected based on your decision to participate in the study. Your participation is voluntary and you are free to withdraw at any time. No collected data will be used if you withdraw. Even if you do not want to participate in the study, you can still respond to the survey questions if you wish; however, your responses will not be used for the research. Your teachers and your classmates will not know that you are not participating in the study.

The Student Consent Form attached with this letter will need to be signed if you would like to participate in the study. Please feel free to contact me at 412-925-8485 should you have any questions.

Sincerely,

Laura Jacob
412-925-8485
schwiri561@duq.edu

APPENDIX J

STUDENT ASSENT FORM

Duquesne University
Institutional Review Board
Protocol #: 12-60
Approval Date: April 26, 2012
Expiration Date: April 26, 2013

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

ASSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms

INVESTIGATORS:

Misook Heo, Ph.D.
Associate Professor
Department of Instruction and Leadership in Education
412-396-1662
heom@duq.edu

Laura Jacob [Student Investigator]
PO Box 416
Claysville, PA 15323
412-925-8485
schwiri561@duq.edu

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in education at Duquesne University.

PURPOSE: You are being asked to participate in a research project that seeks to investigate student engagement in high school foreign language classes with the traditional face-to-face and online virtual world learning environments. You will complete pre- and post-intervention surveys about school engagement before and after participating in regularly scheduled foreign language classes.

These are the only requests that will be made of you.

RISKS AND BENEFITS: There are no foreseeable risks greater than what you would experience typically in the classroom. Your participation may help teachers and researchers learn about student engagement in high schools.

COMPENSATION: You will not receive money to participate in this study, but you will not be asked to pay to participate in this study either.

CONFIDENTIALITY: No one other than the researchers will know what you have responded to the survey questions. Your teachers and your

classmates will have no way to know your responses. You will be assigned a participant ID.

Data collected for this research will be housed in a locked filing cabinet in the student researcher's home, and kept for five years or more.

RIGHT TO WITHDRAW: You do not have to participate in the study. Your grade in the class will not be affected whether you do or do not choose to participate. You are free to withdraw your agreement to participate at any time. If you choose to withdraw from the study, your data already collected will not be used for the research.

SUMMARY OF RESULTS: You can request a summary of the study results for free.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I understand that my participation is voluntary and that I am free to leave the study at any time, for any reason. On these terms, I certify that I provide my assent to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may call Ms. Laura Jacob, Student Investigator, 412-925-8485; Dr. Misook Heo, Advisor, 412-396-1662; or Dr. Joe Kush, Chair of the Duquesne University Institutional Review Board, 412-396-6326.

_____ _____

Student Signature Date

_____ _____

Researcher's Signature Date

APPENDIX K

STUDENT CONSENT FORM

Duquesne University
Institutional Review Board
Protocol #: 12-60
Approval Date: April 26, 2012
Expiration Date: April 26, 2013

Appendix M

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

STUDENT CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Using Virtual Worlds to Identify Multidimensional Student Engagement in High School Foreign Language Learning Classrooms

INVESTIGATORS:

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SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in education at Duquesne University.

PURPOSE: You are being asked to participate in a research project that seeks to investigate student engagement in high school foreign language classes with the traditional face-to-face and online virtual world learning environments. You will complete pre-survey and post-intervention surveys about school engagement before and after participating in regularly scheduled foreign language classes.

These are the only requests that will be made of you.

RISKS AND BENEFITS: There are no foreseeable risks greater than those encountered in everyday life. Your participation may contribute to the knowledge of student engagement in high schools.

COMPENSATION: There will be no compensation for participation in this study. Participation in the project will require no monetary cost to you.

CONFIDENTIALITY: Any identifying information (e.g., demographic information) will be kept confidential and identity will not be exposed in the data analysis. All survey responses will be associated with participation ID.

Data collected for this research will be housed in a locked filing cabinet in the student researcher's home, and kept for a minimum of five years.

RIGHT TO WITHDRAW: You are under no obligation to participate in this study and your grade in the class will not be affected whether you do or do not choose to participate. You are free to withdraw your consent to participate at any time. If you choose to withdraw from the study, your data already collected will not be used for the research.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I understand that my participation is voluntary and that I am free to withdraw consent at any time, for any reason. On these terms, I certify that I am 18 years of age or older and I provide my consent to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may call Ms. Laura Jacob, Student Investigator, 412-925-8485; Dr. Misook Heo, Advisor, 412-396-1662; or Dr. Joe Kush, Chair of the Duquesne University Institutional Review Board, 412-396-6326.

_____ _____

Student Signature Date

_____ _____

Researcher's Signature Date

APPENDIX L

STUDENT PRE- AND POST-INTERVENTION SURVEY

Research Assessment Package for Schools– Student Report

Student ID: C0412

1. What is your class level:
   - □ 9
   - □ 10
   - □ 11
   - □ 12

2. What is your gender:
   - □ Male
   - □ Female

3. How do you identify yourself:
   - □ American Indian or Alaska Native
   - □ Asian
   - □ Biracial
   - □ Black or African American
   - □ Native Hawaiian or Other Pacific Islander
   - □ White
   - □ Other

4. What grade do you expect from this course?
   - □ A
   - □ B
   - □ C
   - □ D
   - □ F

5. What is your consent status:
   - □ I signed for consent/assent.
   - □ I did not sign for consent/assent.

Research Assessment Package for Schools– Student Report

Read each of the following items. For each one, tell us how true it is for YOU by circling one of the six answers: ALWAYS TRUE, OFTEN TRUE, SOMETIMES TRUE, SOMETIMES NOT TRUE, OFTEN NOT TRUE, or NEVER TRUE. There are no right or wrong answers.

1. My teacher has plenty of time for me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
2. I work very hard on my schoolwork.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
3. When I'm with my teacher, I feel good.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
4. My parents never have enough time to hear about what happens to me in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
5. I do my homework because I like to do it.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
6. I don't know how to keep myself from getting bad grades.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

7. My parents don't make it clear what they expect of me in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
8. When I'm with my parents, I feel mad.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
9. My teacher is fair with me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
10. My parents encourage me to find out how schoolwork could be useful to me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
11. I work on my class work because it's interesting	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
12. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I say the teacher didn't cover the things on the test.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
13. My parents don't think I can do very much.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
14. I wish I were someone else.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

15. I'm pretty lucky at getting good grades.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
16. I do my homework because I'll feel bad about myself if I don't do it.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
17. When I'm with my teacher, I feel mad.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
18. When I think about myself, I feel bad.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
19. My parents enjoy spending time with me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
20. My parents don't explain why school is important.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
21. I don't try very hard in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
22. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I try to figure out what I did wrong so that it won't happen again.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

23. I can get my teacher to like me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
24. I can work really hard in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
25. My teacher's expectations for me are way off base.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
26. If I'm unlucky, I won't do well in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
27. My teacher cares about how I do in school	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
28. I can do well in school if I want to.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
29. When I'm with my classmates, I feel ignored.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
30. When I'm with my parents, I feel good.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

31. I pay attention in class.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
32. My teacher doesn't explain why we have to learn certain things in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
33. My parents know just how well I can do in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
34. If I don't do well on my schoolwork, it's because I didn't try hard enough.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
35. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I get angry at the teacher.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
36. My parents do a lot to help me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
37. When I'm with my teacher, I feel unhappy.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
38. I wish I felt better about myself.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

39. The rules in my classroom are clear.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
40. My teacher doesn't seem to have enough time for me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
41. I do my homework because I want to learn new things.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
42. I'm not very smart in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
43. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I try to see what I did wrong.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
44. When I'm with my classmates, I feel mad.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
45. I am unlucky in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
46. I do my homework because it is fun.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

47. When I'm with my parents, I feel unhappy.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
48. I don't know what it takes to get good grades in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
49. Trying hard is the best way for me to do well in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
50. When I think about myself, I feel happy.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
51. I work on my classwork because I'll be ashamed of myself if it doesn't get done.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
52. My parents don't let me make any of my own decisions.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
53. My teacher isn't fair with me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
54. I often come to class unprepared.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

55. My teacher thinks what I say is important.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
56. I wish I liked myself better.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
57. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I say it was the teacher's fault.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
58. My parents like to talk to me about school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
59. My teacher likes the other kids in my class better than me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
60. I work on my classwork because doing well in school is important to me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
61. My parents don't seem to have enough time for me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
62. When I'm with my classmates, I feel good.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

63. My teacher interrupts me when I have something to say.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
64. The best way for me to get good grades is to get my teacher to like me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
65. My parents are fair with me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
66. I can't do well in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
67. My teacher doesn't make clear what he/she expects of me in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
68. When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I tell myself I'll do better next time.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	
69. When I'm with my teacher, I feel happy.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	t
70. I don't know what my parents expect of me in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True	

71. When I think about myself, I feel proud.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
72. I work on my classwork because I'll feel guilty if I don't do it.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
73. I can't work very hard in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
74. When I'm with my classmates, I feel unhappy.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
75. My parents don't talk about how schoolwork is related to what I want to be.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
76. My parents don't seem to know how I feel about things.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
77. My parents trust me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
78. My teacher tries to control everything I do.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

79. I don't know what my parents want from me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
80. I can't get my teacher to like me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
81. My teacher like to be with me.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
82. I'm pretty smart in school.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
83. I work on my classwork because I think it is important.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
84. How important is it to you to do the best you can in school?	A Always Important	B Often Important	C Sometimes Important	D Sometimes Not Important	E Often Not Important	F Never Important

APPENDIX M

TEACHER SURVEY

The RAPS-TM Questionnaire (Modified)

Research Assessment Package for Schools– Teacher Report

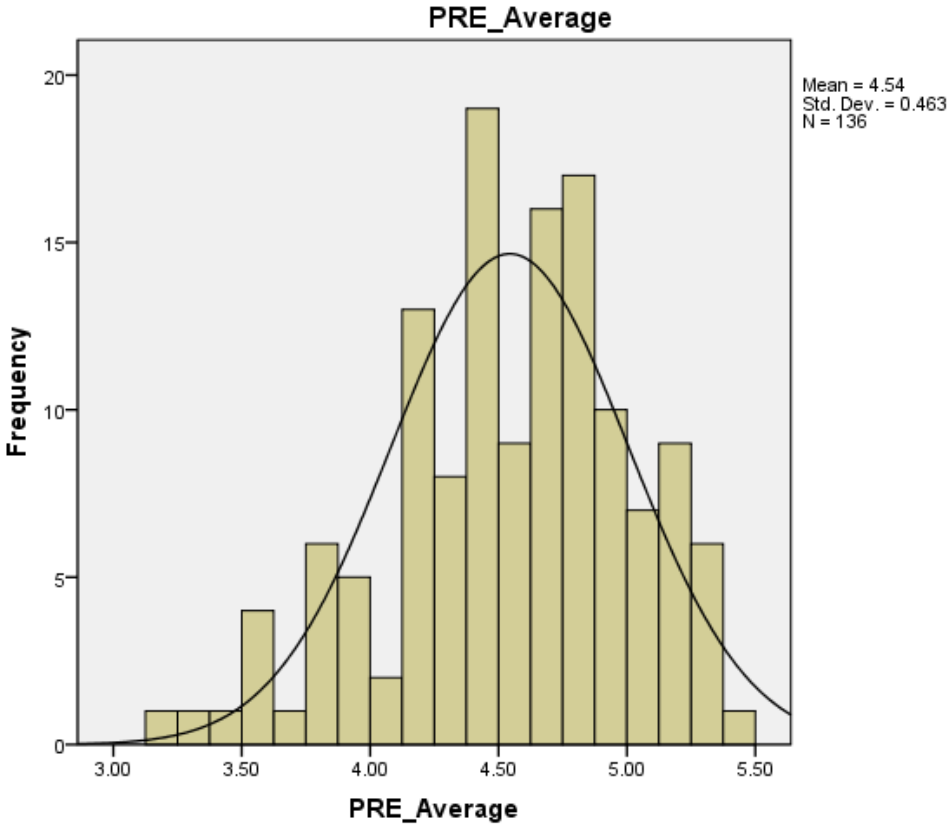
On the following pages, please write in a student identification number for each of the students in your class who are participating in this study. Then, for EACH STUDENT, tell us how true each of the four items is for THAT STUDENT by circling one of the six answers: ALWAYS TRUE, OFTEN TRUE, SOMETIMES TRUE, SOMETIMES NOT TRUE, OFTEN NOT TRUE, or NEVER TRUE.

Student ID:_____

1. In my class, this student seems tuned in.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
2. This student comes to class unprepared.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
3. This student does more than required.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True
4. This student participated during class sessions.	A Always True	B Often True	C Sometimes True	D Sometimes Not True	E Often Not True	F Never True

APPENDIX N

COMBINED ENGAGEMENT HISTOGRAMS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4.00
4.50
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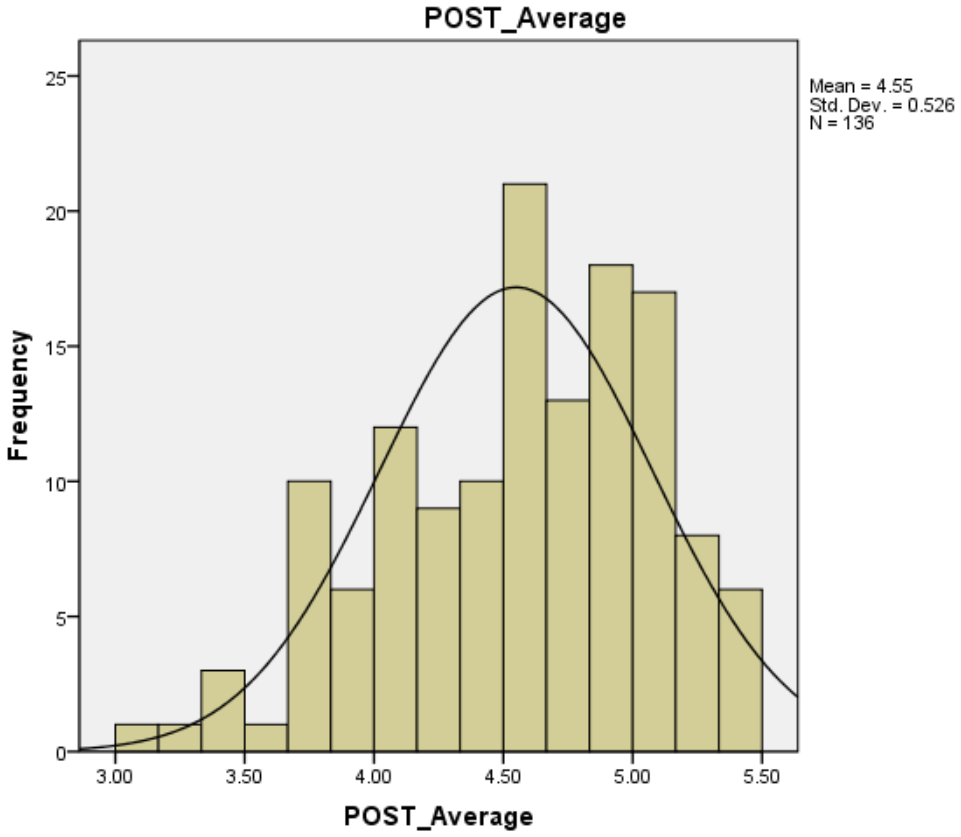
5.50
PRE_Average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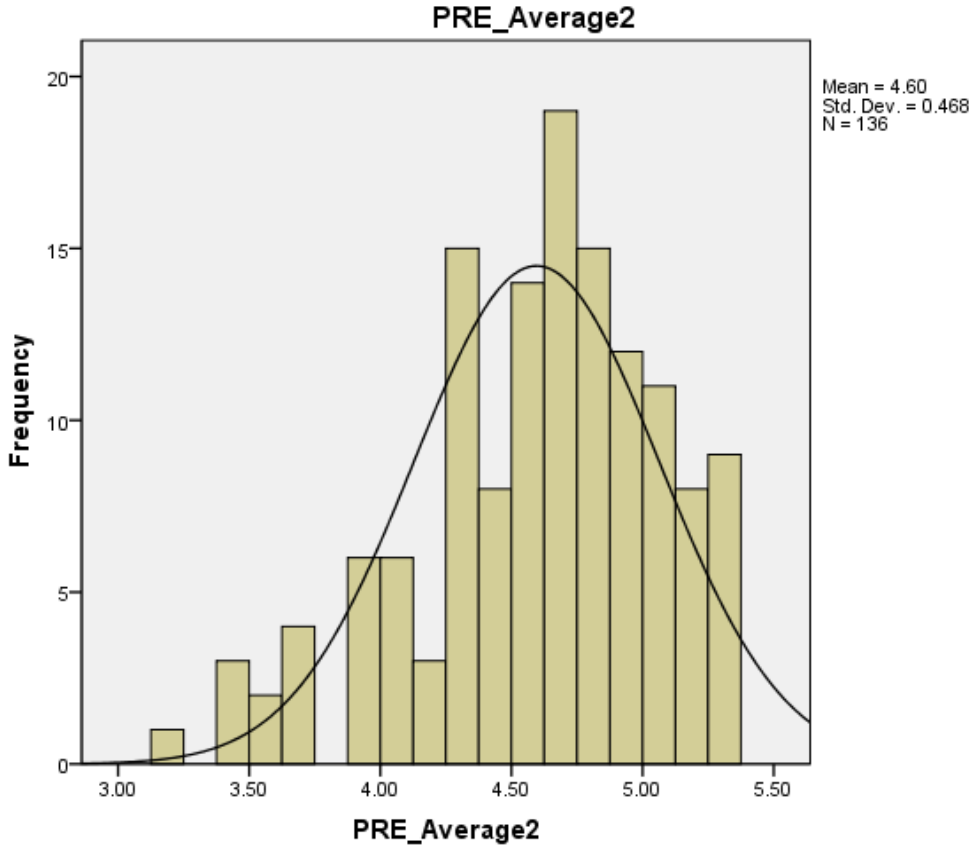
4.00
4.50
5.00
5.50
POST_Average

APPENDIX O

EMOTIONAL ENGAGEMENT PRE-INTERVENTION HISTOGRAM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4.50
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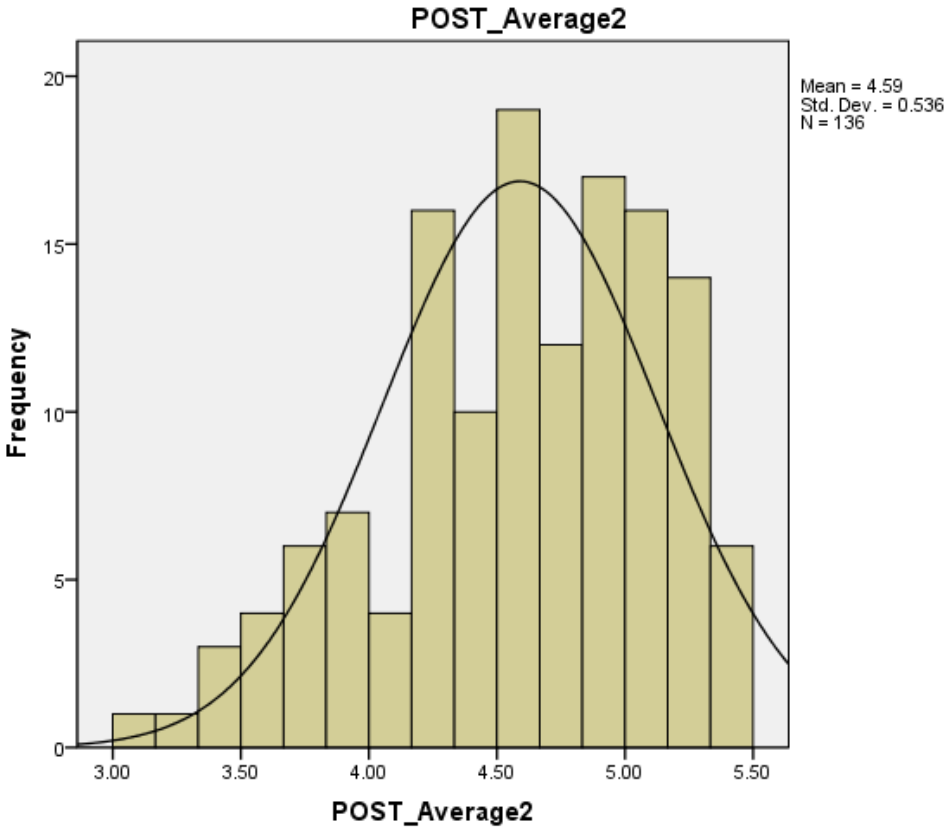
5.50
PRE_Average2

APPENDIX P

EMOTIONAL ENGAGEMENT POST-INTERVENTION HISTOGRAM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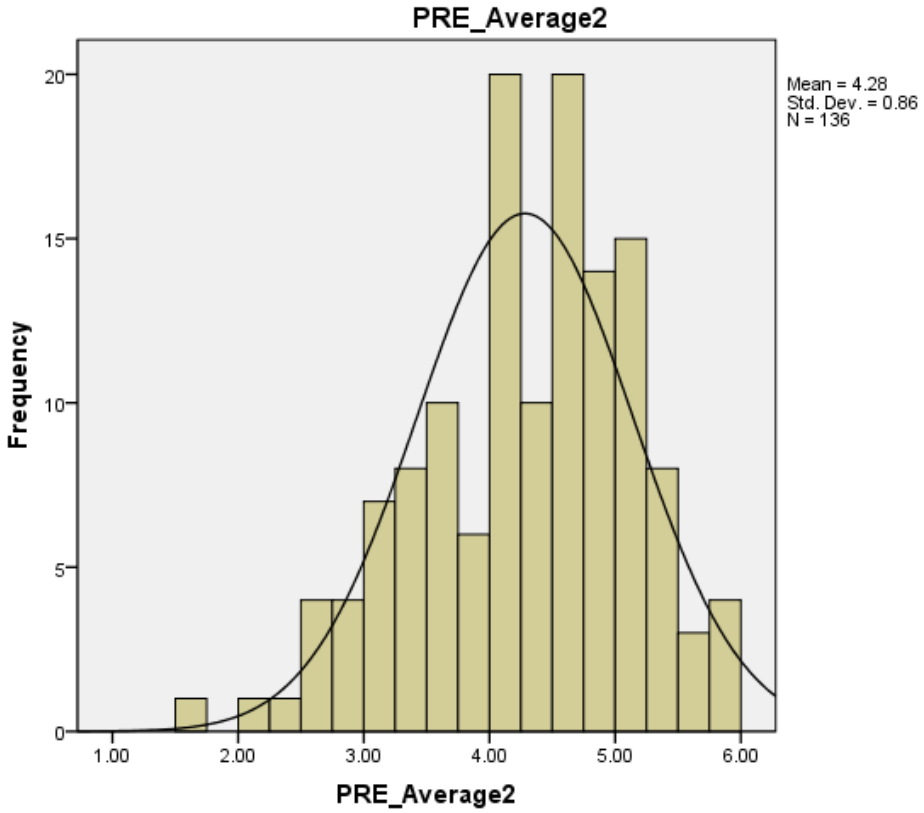
5.50
POST_Average2

APPENDIX Q

COGNITIVE ENGAGEMENT HISTOGRAMS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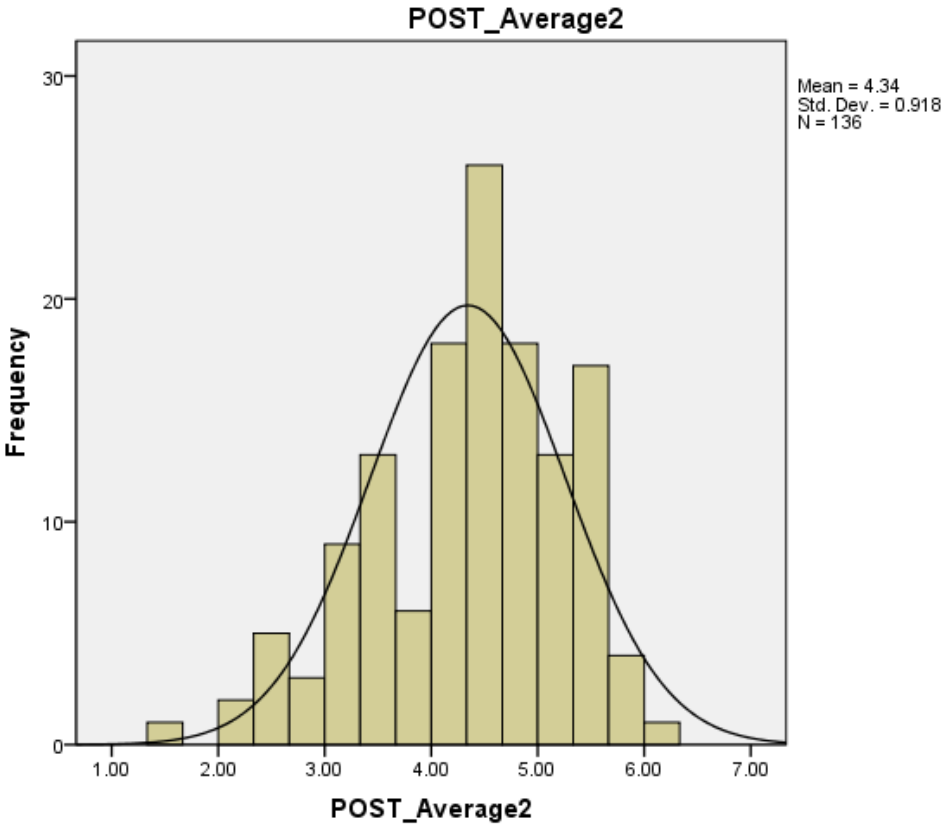
6.00
PRE_Average2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N = 136
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5.00
6.00
7.00
POST_Average2